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MOTOR AGE

VOLUME XXII CHICAGO, AUGUST 22, 1912 NUMBER 8

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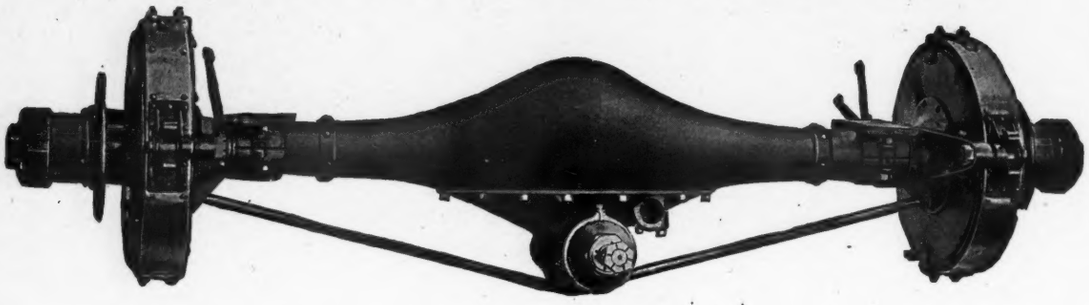

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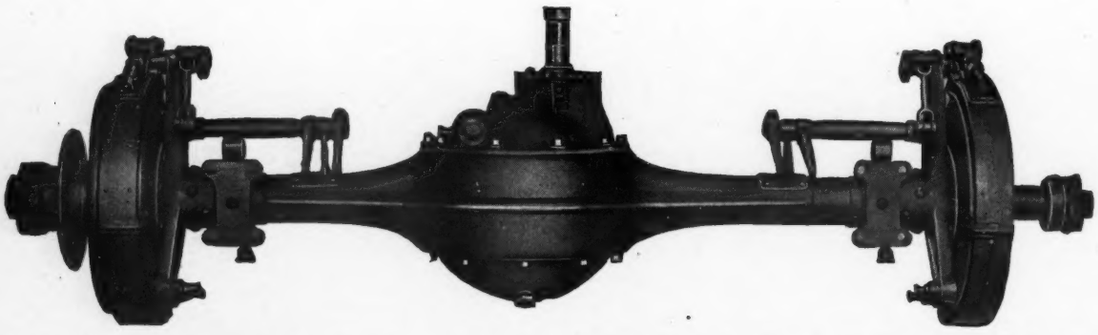

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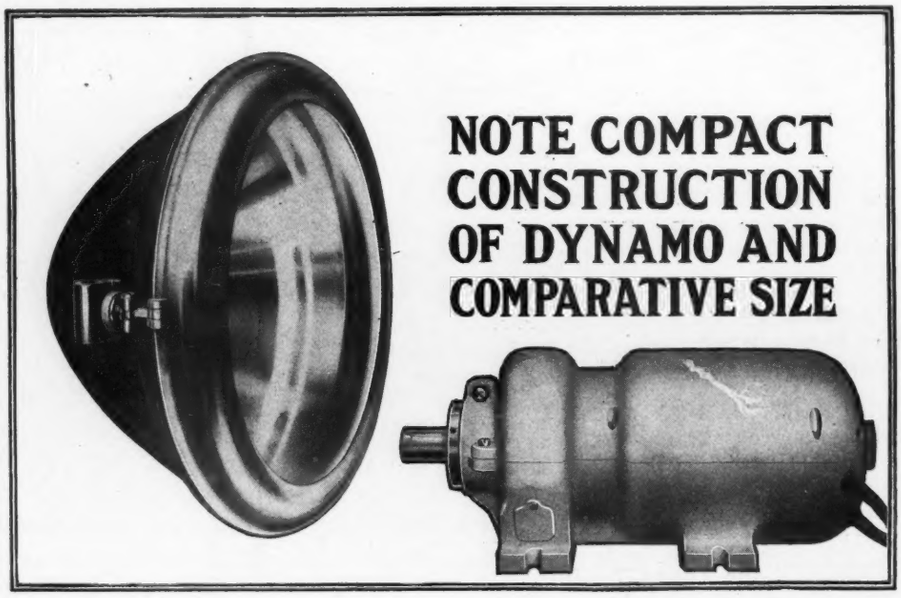

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MOTOR AGE

Army Maneuvers Show Motor's Worth

Mimic Warfare in Massachusetts Produces Interesting Results—Power Vehicles Transport Supplies for 30,000 Men—Value of this Mode of Transportation Impressed on Military Officials and Onlookers

MASSACHUSETTS MILITIAMEN TAKE PART IN ANNUAL MANEUVERS

By J. Edward Shipper

MORE than 2,000 tons of freight were handled through the bases of supply of the Red and Blue armies in 8 days during the Connecticut maneuvers just concluded. The conditions, which paralleled those of actual warfare to an exceptional degree, called for the transportation of supplies for 20,000 men through the lower Berkshire hills. Every problem which possibly could be met with in wartime in a similar country had to be faced by the motor trucks that were employed in the service of both armies, and the unequalled opportunity of showing the value of this mode of transportation was taken advantage of by the government officials and officers of the war department.

In order that the baggage-carrying problem may be understood a general idea of the plan of campaign is necessary. The Red or invading army, whose object was the capture of New York's water supply and eventually the occupation of the city itself, consisted of a full army division numbering approximately 8,000 men. All branches of the service were included, even to an aeroplane scouting outfit included in the signal corps. The army was stretched in an irregular line 20 miles in length. The position of the armies changed toward the latter part of the

SAURER TRUCK WITH LOAD OF CAMP SUPPLIES

campaign, as the Blues were driven back, but during the major part of the time the left wing of the Reds rested in and around Derby, a point 10 miles as the crow flies north of Bridgeport. From Derby the line extended to the northwest with the right wing in the vicinity of Sandy Hook, Conn.

Trucks Aid Retreat

The Blues, defending New York, were in a line opposite the Reds and practically parallel to the front of the invading army. They were slowly retreating westward to take up a strong position on Saturday, the last day of the campaign, when a vigorous battle was fought which the umpires declared a draw, although a Red victory seemed imminent. On the retreat of the Blues from Newtown back towards Bethel, which was one of the secondary supply bases, it was necessary to load considerable baggage hurriedly and send it back under guard. In this emergency it readily could be seen that it was extremely necessary for the men who handled the trucks to have instruction in scientific loading. A poor job was made of this phase of the situation in nearly every instance noted, the biggest mistake being that articles which should have been placed first were put on last, necessitating much more unpacking work than otherwise would be necessary. As for numbers, the Blue army was composed of 6,500 enlisted men with officers bringing up the total to 7,500. Outside of the two armies were a large number of umpires and neutrals.

Each army had a general supply depot from which the supplies were carried to three or four secondary bases along the rear of the fighting line. From the secondary line to the camps conditions were apt to be anything from good hard dirt roads down to rough fields and thickets, but from the main depots to the secondary depots the traveling was mainly over hilly country with dirt roads. The baggage-carrying problem can be fully appreciated when this plan of action, which is typical of campaign work, is carried out. The main base of supplies is nearly always a railroad town. In these maneuvers such was the case. The Blue army had its base at Danbury on a branch of the New York, New Haven and Hartford Railroad; the Red army had its supplies at Derby on another branch of the same railroad. Carrying the baggage from the bases of supplies to the secondary bases is where the greatest work of the motor truck was done. It was in this work that they had the best success and showed conclusively that they had displaced the mule train in this field.

Followed the Soldiers

From the secondary bases to the field of operations motor trucks were also used to a great extent. A brigade of Massachusetts state militia in the Red army encamped a short distance from Sandy Hook had two White trucks with it. These were each of 1½-ton capacity and went almost wherever the soldiers went. In this particular instance the troops were encamped in a level field alongside the road and the truck was run into the field itself and took up a position within 25 feet of the camp kitchen. This was exceptional, as everywhere else the motor trucks had to be unloaded at the entrance to the camp or else could not be taken into the field for anything but a short distance.

Compared with Mules

From the main base to the secondary base the motor truck achieved the highest success. Some of the trucks, among which were the 1½ ton Whites owned by the New York and Massachusetts state militia, were geared to run as fast as 30 miles an hour. The ability of the motor truck to deliver one load and return for another was excellently demonstrated on many occasions. One of the National Guard of New York trucks made the run from Stratford to New York and back, a distance of 60 miles each way, in 12 hours. This included 4½ hours spent in loading. The roads between these two points are mostly good but some of them are badly worn, the average, however, of 18 miles an hour would be excellent for a touring party, especially in that the run was made through several villages.

A mule team will average 2½ miles an hour. The mule is as nearly free from exhaustion as it is possible for an animal to be. There have been cases where they have worked for practically 24 hours without any appreciable rest. By hitching four and often six or eight mules to a wagon it can be dragged anywhere except through large trees. The fact that the mule team can drag a company wagon which has a 3000-pound capacity through underbrush has been demonstrated on many occasions and for this reason he is of the greatest use where the supplies are taken from the minor bases right to the front. When the mule no longer can take the wagon with him he can be used as a pack animal and can stand a load of 300 pounds. A pack animal can go practically anywhere a man can go and in even an extensive campaign where short distances through an exceedingly rough country have to be traveled, he can aid materially in lessening the burden borne upon the backs of the fighting men.

Average 48 Miles a Day

Where the roads are good the motor truck comes into its own. In fact there is no competition here. Its speed enables the provisions to reach camp in time. It can make two or three trips one after the other. The movable secondary supply bases can be a greater distance from the railroads and hence make the final hauls shorter. In the manoeuvers the motor trucks, from the main base of supplies to the secondary bases, averaged 48 miles a day while the field train motor cars carrying the provisions from the main base to

MOTOR EQUIPMENT OF THE BLUE ARMY

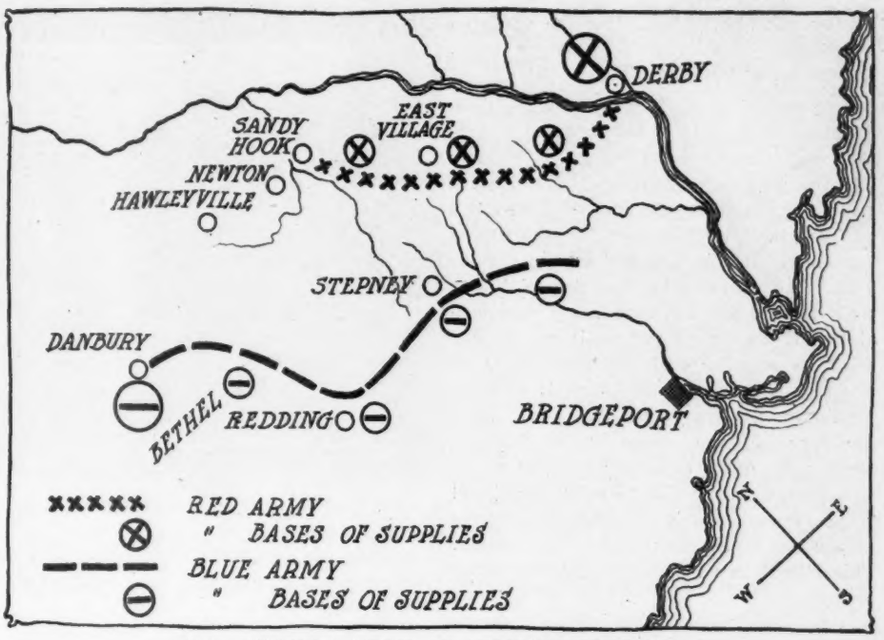
Truck	Organization	Size
G. M. C.	Quartermaster	5-ton
G. M. C.	Quartermaster	3½-ton
G. M. C.	Quartermaster	3½-ton
G. M. C.	Quartermaster	2-ton
Packard	Second N. Y. Brig.	3-ton
Packard	Second N. Y. Brig.	3-ton
Packard	Second N. Y. Brig.	3-ton
Packard	Second N. Y. Brig.	2-ton
Alco	Second N. Y. Brig.	3-ton
Sternberg	Second N. Y. Brig.	2-ton
White	Second N. Y. Brig.	3-ton
Packard	Provisional Art.	3-ton
White	Provisional Cav.	3-ton
Gramm	N. Y. Engineers	3000 lbs.
Saurer	N. Y. Engineers	4½-ton
White	Forwarding Hos.	1½-ton
White	Forwarding Hos.	1½-ton
Decatur	First N. J Brig.	2-ton
Kelly	First N. J. Brig.	3-ton
Kelly	First N. J. Brig.	3-ton
Kelly	First N. J. Brig.	2-ton
Federal	First N. J. Brig.	2-ton
White	Both Armies	3-ton
Panhard	Headquarters	Pleasure car
Mitchell	Headquarters	Pleasure car
Cadillac	Headquarters	Pleasure car
Cadillac	Headquarters	Pleasure car
Franklin	Headquarters	Pleasure car
Hudson	Headquarters	Pleasure car
Stevens-Duryea	Headquarters	Pleasure car
Pierce-Arrow	1st Cavalry	Pleasure car
Lozier	2nd Cavalry	Pleasure car
Matheson	2nd Cavalry	Pleasure car
White	Umpire	Pleasure car
White	Official	Pleasure car
White	Official	Pleasure car

the fighting line, averaged 42 miles a day. The average gasoline consumption of these trucks was high, the mileage averaging 3⅝ to the galloh. The best truck proved to be the 1½ and 2-ton variety. These were all overloaded by at least 25 per cent and carried their burdens remarkably well. Where the 5-ton trucks were used, however, it was impossible for them to carry their designed load. One of the 5-ton trucks was so heavy itself that it became mired when only carrying sufficient tenting and food for a company.

Officers Enthusiastic

Colonel Bellinger, chief quartermaster, when seen at his headquarters at Camp Lee, Stratford, Conn., said: "I am firmly convinced that the army truck has come to stay. Where the roads are suitable it can not be superseded. I do not mean to state that it will ever entirely displace the mule, but in that part of the country where the roads justify it the motor truck is far superor to other forms of baggage-carrying apparatus owing to its speed, its less cost of upkeep than the mule and the fact that it never becomes tired, but will work as long as it has fuel and water. At present we have very few, but the war department intends to buy more."

This was the general opinion of the officers of higher rank through both armies. In some instances it was found that the commanders had expected too much of their trucks. This was notably the case with the Blue artillery encamped at Bethel, Ct. Three batteries of field artillery in this instance had depended on four 5-ton trucks to a considerable extent and had correspondingly cut down the number of mule and horse teams. These were too big. Early in the campaign, through faulty driving, one of these trucks became so badly mired that it had to be abandoned for 3 days. Another 5-ton truck could not be driven over a weak bridge, so the driver attempted to take it through the shallow



MAP SHOWING SCENE OF MILITARY MANEUVERS

stream to one side of the bridge. It rested in the bed of the stream for 3 days before it could be moved.

Smooth Tires Fail

A mule team would have brought the truck through the stream readily, for the simple reason that the mule has traction in the mud, while the wheels of the truck, shod with smooth tread tires, spun around and could not take a grip. Too little attention was given the tires. Smooth treads were used when something that had more grip would have been far more practicable. When there is any wet weather at all the smooth tread tires cannot compete with the situation. Some form of mud hook or non-skid device is a necessity in wet weather.

Pneumatic tires or tires filled with some resilient compound are a necessity according to the majority of officers in the different quartermasters' departments. The Massachusetts brigade of state militia had two 1½-ton White trucks. These were identical except that one had the smooth-tread solid tires, while the other had dual pneumatics. The latter proved far better in the rough country work, as the vibrations were considerably less. This was the truck that the Massachusetts regiment was able to take directly into the field camp with it while in nearly every other instance the trucks had to be unloaded some distance from the spot in which the supply was needed and a detail of men was necessary to get the provisions into the right places.

Truck Replaces Railroad

There is another field of activity where the army motor truck stands supreme. In a country where the railroads do not penetrate near enough to the fighting lines the truck takes the place of the train. It renders it possible to have the main base of supplies a greater distance behind the firing line and hence renders the possibility of the capture of the base a remote possibility unless the defending army was entirely routed. As an aid to the quartermasters' department, if properly applied, it is invaluable. The 1½- and 2-ton trucks have proved superior, they are faster, can make more trips, can penetrate through narrow lanes, do not become mired so readily, can be 25 per cent overloaded for a short time without damage, and can equal the performance of the larger trucks in the way of carrying because the latter have demonstrated in this campaign that it is impossible for them to safely carry the designed load. The method of carrying provisions depends on the country to an enormous extent and the order in which the merits of trucks of different sizes may be graded depends on road conditions, but for all around effi-

WHITE TRUCK PROMINENT IN THE MANEUVERS

ciency and ability to deliver the goods on reasonable roads the light motor truck stands supreme.

For special work there is a large field. In the signal corps of the Red army there was one 3-ton truck. It was used entirely for the purpose of carrying around extra parts for the aeroplane scouts. This truck did excellent work because it was driven carefully. It was mounted on the regular 3-ton White chassis, but had a special open flare-board body built to army specifications. It always was where it was needed with its supplies and the commander of the aeroplane scouts said that it was exceedingly necessary for them to have another of the same type because there were other articles necessary to be transported from point to point for signal corps use and that it required the services of the one truck for the three aeroplanes. This left them no motor vehicle for other purposes.

Requirements for Hospital Work

Ambulance work offers a field which can be developed to a remarkable extent. According to the consensus of opinion of a number of army surgeons who were interviewed while in the field during the 8 days of manoeuvering, the main objection that they have seen has been the fact that the motor ambulances so far have not had sufficient carrying capacity. They become superior to the horse-drawn vehicle when they can carry more at the same speed. The motor ambulance should have a capacity of eight wounded; so far they have been adapted only for four. Along the battle line the wounded are picked up by the hospital corps attached to each brigade. This is accomplished by means of the stretchers which are attached to the ambulances. The wounded are carried back of the firing line and given temporary treatment when necessary. They are then placed in the ambulances and carried back to the field hospital which may be a distance of 5 miles behind the lines or practically any other distance, depending on circumstances. It is easy to see that the problem is to get back from the hospital for another load just as quick as possible and this is the strong point of the motor ambulance.

WHITE TRUCK DELIVERING SUPPLIES TO QUARTERMASTER

The ambulance car should be mounted on special springs. This fact has been amply taken care of in hospital cars for city work, but in field work the matter should go still further. If high speeds are to be reached without jar to the occupants the suspension of the ambulance will have to be made a special study. The ambulance needs plenty of power and should have, according to the experience of officers who have made a study of the problem, four speeds in order that any condition of the road can be met with successfully and when a high speed on direct drive is possible over a good road the situation can be taken advantage of.

Red Cross Conditions

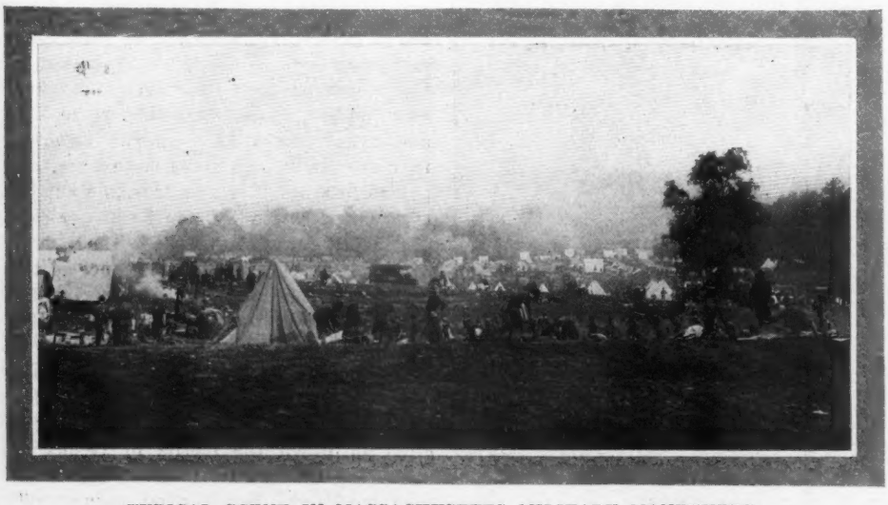
In the present state of affairs a wounded man costs an army more than three dead men. The steel-jacketed bullets now in use leave a clean, small hole which does not kill a man unless it hits some vital spot, and since their use the percentage of wounded men has risen to an enormous extent. Anything that can cut down the cost of handling a wounded man will be invaluable to armies of the future and there is no reason that a properly designed motor ambulance can not do this. It cost $5 a day for an army to support a man and a pair of mules. If four mules are used to the ambulance, the outfit, including the driver, will cost $10 a day. What the cost of an ambulance car would be that could carry double the number—eight—wounded remains for future campaigns and designers of such vehicles to bring out. At present there are none of these available.

Handling Fuel Supply

The way the gasoline problem of these trucks is handled depends altogether on where a campaign is taking place. In the manoeuvres through Connecticut it was by contract with supply stations in the different towns. The trucks working between the primary and secondary bases of supplies required about 15 gallons of gasoline a day. On the last trip into town the truck would refill its tanks.

There were no cases where a separate fuel wagon was employed as might be necessary in a campaign through a country where the towns and villages were more scattered than they were during the manoeuvres. In an extended campaign the matter would have to be taken up in the same way as the rest of the supplies such as food and ammunition. The main base of supplies would be used as a central distributing point for the minor and movable bases, making two hauls to the front. Where an exceptionally large army is in the field it may even be advisable to have another subdivision of supply bases for gasoline in order that the motor vehicles working along the front will not have to travel a long distance to get to the source of fuel supply. As will be explained, there are always a number of motor cycles and pleasure cars in use along the front and it would be exceedingly expensive in time as well as in fuel for these cars to go a long distance to reach a point where they could take on more fuel.

There is no doubt that greater satisfaction would have been had with the motor trucks in the manoeuvres if they had been all specially adapted for army use. Nearly all the trucks in use were hired. The



TYPICAL SCENE IN MASSACHUSETTS MILITARY MANEUVERS

PLEASURE CARS WERE USED BY THE OFFICERS

National Guard of New York, which was distributed between both armies, had twenty motor trucks of miscellaneous sizes. Out of these eighteen were hired; the remaining two were the Whites mentioned before. The Fourth Buffalo brigade of this organization had a 10-ton Pierce-Arrow truck which made the run from Buffalo to the field of action in 4 days. It did excellent work for its size, but had to be unloaded at every suspicious bridge, a condition that would have been disastrous in many circumstances which could arise in a campaign. The capture of a baggage train is the worst disaster that can happen to an army and a train of overloaded trucks belonging to a fast-retreating army would be the joy of any pursuing general's heart. Out of the eighteen miscellaneous sizes of trucks hired by the New York militia, the 1½ and 2-ton trucks here also did the best work. The 3-ton size seems to be the outside limit giving satisfactory results in this kind of country. Anything above can not carry the designed load.

Pleasure Cars as Officers' Mounts

The pleasure cars used in connection with the manoeuvres were a distinct success. Connected with the Red army headquarters were seven touring cars, while with the various brigades there were an ever-varying number loaned by friends of the officers. Attached to the chief quartermaster's headquarters in the neutral camp there were seven touring cars, of which five were hired or loaned and the other two, a Cadillac and a White, were the property of the war department. In the Blue army there were seven touring cars, also a Panhard, Mitchell, two Cadillacs, a Franklin and a Hudson. The field umpires also used a varying number of cars which were loaned for the particular occasion.

The greatest use to which the cars seemed to be put in the Connecticut mimic war was the transportation at high speed of the officers from one part of the field of operations to another. When used in this connection the speed at which the officers travelled averaged over 30 miles an hour on good dirt roads which traverse this part of the country. Aides could be carried from the staff headquarters to within reach of the battle line in a remarkably short space of time. There were very few if any horseback couriers at all in the entire campaign; the newer and quicker method of transportation seemed to have completely supplanted the horse.

Tires a Bugaboo

The only trouble that bothered the motor courier was the old bugaboo of tires. It might be that here the air-substitute man will have something to say, for a blowout on an emergency message would render the trip slower in many cases than the horse could make it even if he cast a shoe along the way. Rough roads and fast work combined make the cost of tire mileage mount to an extraordinary great degree. An estimate on the cost of tire upkeep through the campaign work in Connecticut may be placed at 12 cents a mile where the car was driven well. Along the road it was possible to see many breakdowns and out of nine by count there was only one that was not due to a puncture or a blowout; the exception was a worn fan bearing bushing.

The motor cycle also was much in evidence for scouting purposes. In the Blue army a detachment of negro cavalry from the Tenth United States cavalry was sent forward to locate the enemy. Behind it were messengers on motor cycles who carried the reports of the scouts back to headquarters. For this work the motor cycle is successful. As far as having cycle brigades, however, the idea is not feasable because they are too difficult to transport over country where they cannot be used. Courier work on motor cycles was not carried out to the extent it should have been, the more expensive motor car being used in many cases where the motor cycle would have served the purpose just as well. For the carrying of messages the motor cycle is better than a motor car because it can get anywhere just as fast as a motor car can go, it is lighter on tires and is cheaper to run. For carrying officers from one point to another a motor car is necessary.

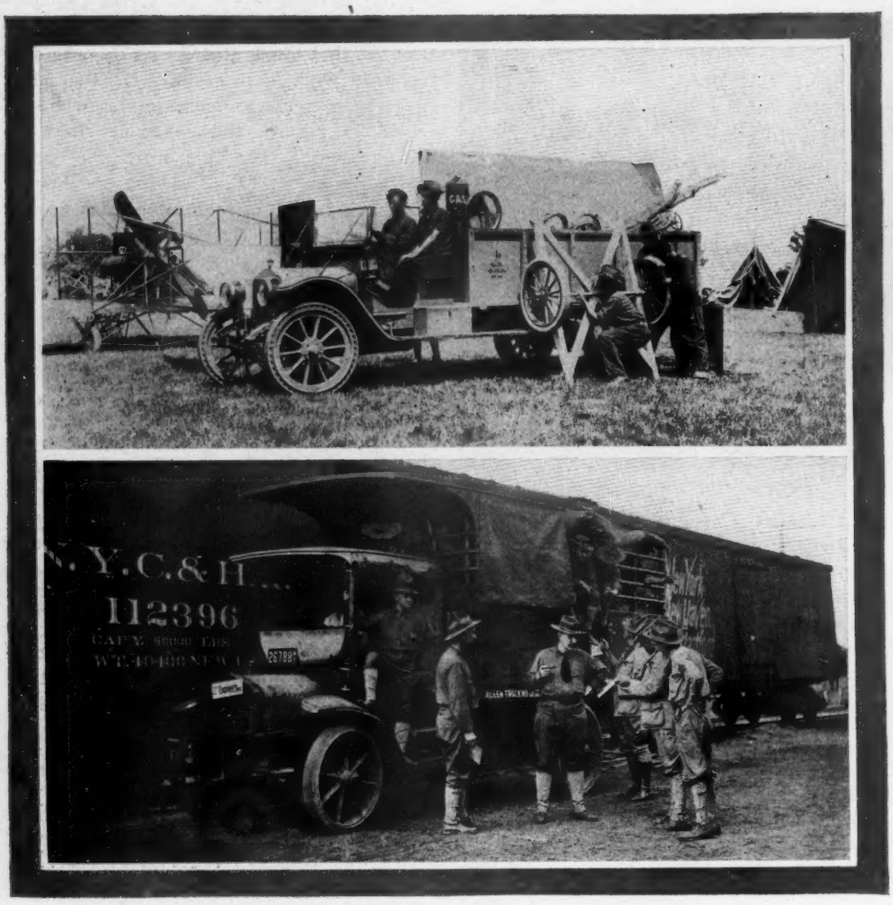
Army Mule Equipment

To what extent the motor apparatus can displace the horse and mule it is impossible as yet to state. At the present time the army regulations call for the following mule outfit:

	Mule teams
One regiment of infantry	20
One regiment of cavalry	31
One battery of artillery	13
One company of engineers	2
One company signal corps	2
One brigade-hospital corps	2
Attached to quartermaster department of a division	12

The capacity of the mule wagons is 3,000 pounds and they cannot stand much if any overload, especially since the supplies carried are of a very bulky nature. In all work where the hauls are of 20 miles or less and many trips can be made carrying a load of two tons at a time the automobile truck will displace four of the mule teams owing to its ability to return for another load while the mule team is out after it has made one trip. This would give the truck a run of 80 miles for the day, while the mule team would only go one way in this time, for a run of 25 miles in a day is the limit where the team is working day after day. The mule team

CITIZEN SOLDIERS UNLOADING TRUCK AT BETHOL



SOLDIERS LOADING AEROPLANE ON TRUCK
MILITIAMEN PICK UP SUPPLIES FROM FREIGHT CARS

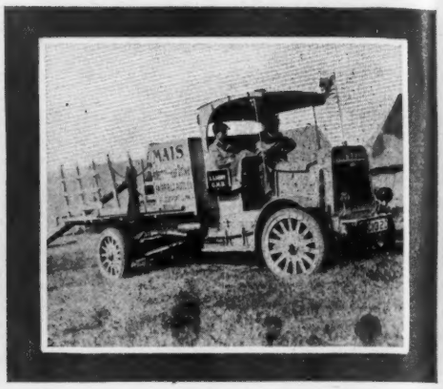
would be compelled to make the trip 1 day, bringing the supplies, and go back the next day empty or with wounded men or whatever had to be taken back to the rear. When this is considered it is sufficient to place the mule in the list of obsolete army accessories for this kind of work. The motor truck has superseded the field train for hauling from the base of supplies and only in the very limited condition of impassable roads is it impractical to use the truck along the actual battle front.

The fact that so many of the trucks were hired at the last minute gave rise to the condition that every conceivable type was used. This was bad from the standpoint of carrying efficiency, but enabled the observers to make a close study of the merits of each. The big furniture and piano moving vans had too much body weight and could not be unloaded except through the back door, which made them exceptionally unwieldy. The openstake body and the regular prairie wagon style of army body proved the best for all around use.

Truck Needed for Wireless

The field telegraphers using wireless apparatus used horse wagons, but were nearly unanimous in the opinion that better work could be done with motor apparatus. There is room here for a specially-designed vehicle which will provide charging current for use in the wireless work. Telegraphers using the ordinary wire apparatus were confined in these maneuvers to cross country work almost entirely and neither mule nor motor vehicles were particularly adaptable for their purposes. A properly designed vehicle could be of benefit in wireless work.

With the Blue army headquarters there was one potential machine gun mounted on a touring car body of a Mitchell six. The gun was not there, and nobody but the umpires knew that the harmless appearing car was so equipped. It was not called into actual use during the campaign so that it is impossible to state what could be done with guns mounted in this way.



MAIS TRUCK USED IN TEST

Summing up the entire situation it can be said that there never will be another campaign in which motor apparatus does not play an important part. The mule-team never will be used for repeated long distances over good roads. That is a thing of the past. The motor army truck of the future will not be a converted furniture van, but will be especially adapted for army service. The average wagon will not have a capacity of more than 2 tons and very few, if any, will have a capacity of more than 3 tons. The 5-ton trucks are too heavy. Fast runabouts and touring cars will displace the horse for the use of aides-de-camp and the motor cycle will be a valuable asset in carrying reports from the scouts back to headquarters. From the Connecticut maneuvers the indications are that the army is gradually saying good-bye to its old standby, the mule.

ACCIDENTS SCARE INSURANCE MEN

Hartford, Conn., Aug. 17—Bertrand A. Page, vice-president of the Travelers Insurance Co. of Hartford, Conn., has just returned from the convention of the International Association of Casualty and Surety Underwriters, held at Fortress

COMMISSARY TRUCK REACHES NIGHT CAMP

A GENERAL MOTORS TRUCK

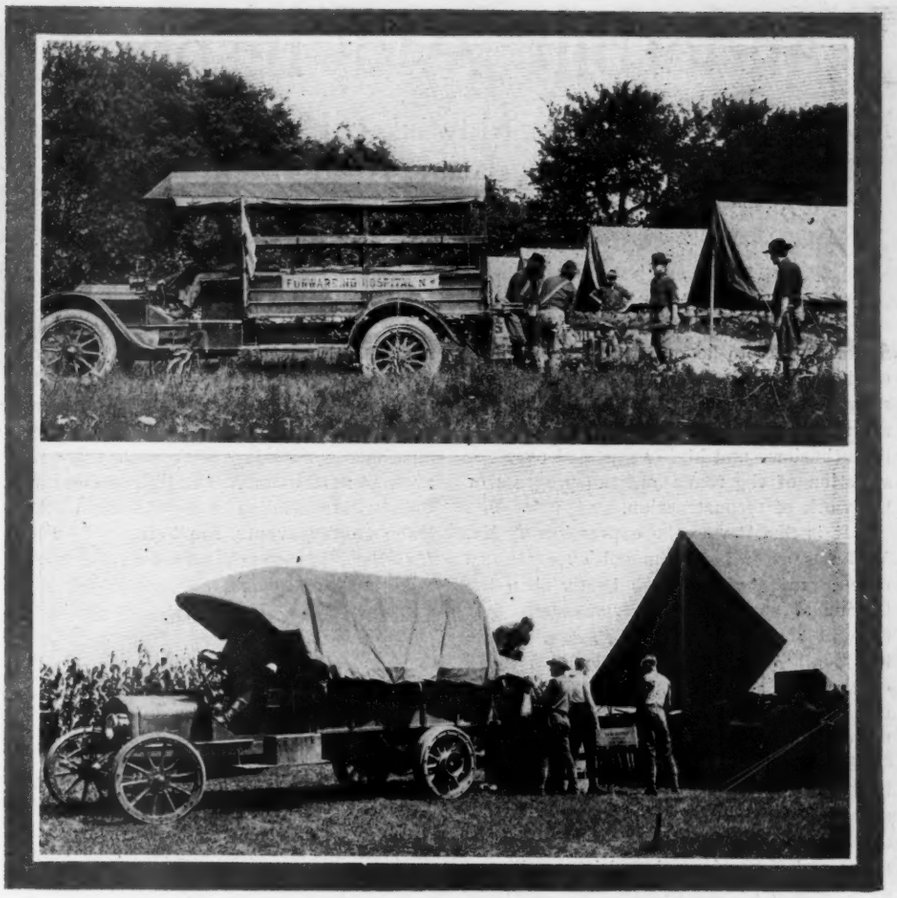
Monroe, where he read a paper on the question of motor accident insurance. He pointed out that because of the rapid increase in the losses due to motor car accidents, which in 1911 amounted to almost 22 percent of their totals, accident insurance men are becoming very much alarmed. He showed that in 5 years prior to 1906 motor car losses amounted to less than 3 percent of all losses, rising rapidly since then. To meet this the insurance men are considering higher rates or less liberal policies. Among other things he said:

"Ten years ago, roughly estimated, there were less than 100,000 pleasure motor cars in the United States and Canada. Today there are at least 900,000 in use. While the motor claims have been steadily on the increase, there has been no appreciable diminution in horse and vehicle accidents. The average amount paid for claims under this heading for the 5 years, 1902 to 1906 inclusive, was 10.4 percent of the total losses. In the year 1911 we find horse and vehicle accidents constituting 6.6 percent of the total in amount of claims, and motor car accidents 21.8 percent of the total.

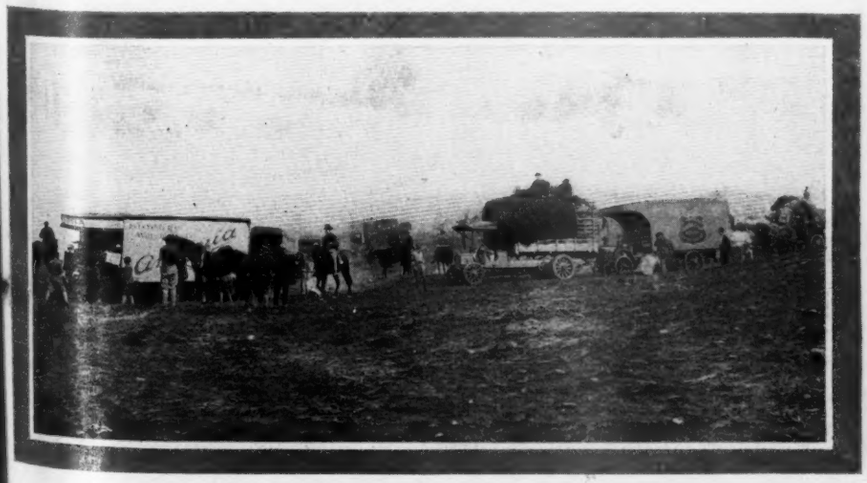
"Indemnity claims from motor accidents May, 1906, to April 1, 1912, in the amount paid were in excess of the death losses during the same period; 548 claims were paid last year for cranking accidents alone. Of the 1,335 motor claims in 1911, 1,317 were for indemnity losses.

"Much has been said about the necessity for higher rates or a less liberal policy contract. With motor accidents constituting in the year 1911 about 22 percent of the claims in amount and over 10 percent in number, it would appear that the remedy for the situation lies in the securing of an adequate rate in connection with the insurance of those who use motor cars daily. It is unfair to charge the non-user for the claims incurred by his more exposed neighbor.

"Ten years ago there was practically no such thing as a motor accident. Last year, claims from select, preferred and ordinary class risks were increased by automobile accidents 28 percent, and this does not take into account horse and vehicle accidents caused by motor cars, nor injuries to pedestrians and persons on bicycles, motorcycles, etc., who were run over or into by cars. During the past few years the motor car has been the big factor in increasing claim loss ratios, although unwarranted liberalizations in the policy contract have not been without their effect."



SOLDIERS PUTTING WOUNDED MAN IN AMBULANCE
NATIONAL GUARD TRUCK GETTING FOOD FROM MESS TENT



SEVENTY-FIRST REGIMENT AND TRUCKS LEAVING CAMP

RAIN MARS MISSISSIPPI TEST

Greenville, Miss., Aug. 20—Rains, which delayed the A. A. A. reliability tour's pathfinder, contributed to the failure of Memphis Automobile Trade Association's endurance test. Of the twenty cars that entered only five reached Greenville, the others returning after the heavy rains began. Two Cadillacs, an Overland, a Studebaker 20 and a Hudson pulled through the mud to this city.

BUFFALO MOTORIZING

Buffalo, N. Y., Aug. 19—Motorization of the entire Buffalo fire department is to take place within a short time, according to fire commissioners of that city. Buffalo is to receive its second motor combination chemical and hose wagon from the Victor Motor Truck Co. on Saturday of this week and now that city is planning to add a motor-driven aerial hook and ladder truck to its fire equipment.

Vanderbilt Aid Inspects Race Course

E. G. Williams Declares Milwaukee Has Circuit of Great Promise—Work of Surfacing Roads Starts—Brewers Counting on Sixty Entries in Four Events—Gossip

MILWAUKEE, Wis., Aug. 20—William K. Vanderbilt, Jr.'s personal representative, E. G. Williams, inspected the course being prepared for the four big motor classics to be run under the auspices of the Milwaukee Automobile Dealers' Association on September 17, 20 and 21, and returned to New York on last Saturday full of enthusiasm and highly gratified over the selection of the roads and the progress of the work of reconstruction.

"It is fine," was the expression of Mr. Williams after being hauled over the 8.2 mile course. "It is much better than the Greenfield course you Milwaukeeans first thought of using for the big races. Those two 3-mile straightaways will add a touch of the real sport of motor racing, and I think some new marks will be hung up if the course proves as fast as it looks today. One of the best features of the roads you have selected is that high speed can be maintained throughout its length, for your turns are wider than the rule and of such shape and dimensions that drivers will not have to slow down to the extent that they do on less safer turns on other courses."

Surfacing the Roads

The work of surfacing the roads with a 70 per cent asphaltum composition with screenings began on Monday morning. A. B. Chamberlain, of New York, who has the contract for oiling the course, arrived on Saturday and has already organized his crews. The first oil has been applied on the Town Line road, the upper or north leg of the course, but the bulk of the work will await a thorough drying of the surface, following heavy and continuous rains.

During last week there were showers on all but 1 day, and this condition has interfered slightly with the progress of the road work. However, before the contract was taken, allowances were made for exactly such conditions, and the completion of the work will not be delayed 1 day unless some serious situation should arise which cannot be discerned at this time. One week from Saturday the course will be ready for the space-eaters. The drivers already entered for Milwaukee who will be seen at Elgin will beat it from the Illinois course to Milwaukee and find the course ready for preliminary practice when they arrive.

Many Visitors at Course

It has been necessary for the M. A. D. A. to hire a corps of special policemen to patrol the course and keep visitors from annoying the road construction crews with lengthy conversation and delaying the work by continual running over the roads and back. The course is so close to the city that on a Sunday afternoon it is impossible to drive a car onto any point on the course.

It is likely that no definite idea of how many cars and drivers will run in the four events at Milwaukee until the Monday following the Elgin meet. It is known, however, that sixty cars already have been nominated, meaning that each field will average fifteen cars. The light classes, the Pabst Blue Ribbon and Wisconsin Challenge trophy events, are being well filled, the extra large cash purses and the cups being an inducement.

Locating Start and Finish

Manager Ruddle, Chairman August A. Jonas and the race committee planted the first stakes for the location of the start and finish line and the grand stands, official stand, pits, press tower and other buildings, late last week and the carpenters are playing the anvil chorus from early morning until late at night. The layout of the stands is claimed to be an improvement over anything yet tried for road races. The grandstand is being offset so that the watchers may get a better view of "car coming." The pits are opposite the official stands and directly in front of the grandstands, separated from the box sections by a promenade.

Racing camps already are being selected by team managers. The first on the ground was Hughie Hughes, the Mercer pilot, who is going in at least three events, the Pabst, Wisconsin Challenge and Vanderbilt. It will be a 3 weeks' outing in the country for some of the racing teams, as the ground around and within the course is in many spots most beautifully wooded, away from the dust and grime of the city but close enough for convenience.

The advance sale of seats for the road carnival is most gratifying and there is every reason to believe Milwaukee will come out of the meet without loss.

M. C. A. HOLDS MEETING

Detroit, Mich., Aug. 18—The regular mid-summer meeting of the general rules committee of the Manufacturers' Contest Association was held on Thursday, August 15, at Hotel Pontchartrain, Detroit. At this meeting suggested changes in the contest rules were discussed to be later recommended to the contest board of the American Association for adoption.

Never before since the M. C. A. was organized in 1909 have there been fewer suggestions regarding changes in the rules. This is good proof that the contest regulations of the past year have worked out to the satisfaction of every one in nearly all cases.

In order to obtain the sentiment on contest matters among manufacturers in general, regardless of membership in the M. C. A., a set of questions was recently sent out to 130 different concerns. In all of the answers received only one was not enthusiastic over the good the association has accomplished during its existence.

The answers also showed a unanimous belief on the part of makers that contests in this country should be regulated as in the past. Sentiment regarding stock and non-stock competitions was about evenly divided.

Other matters of routine nature were discussed, including the future of contests, especially those in which the commercial vehicle will figure prominently.

TRANSCONTINENTAL ALCO CREW CAMPED NEAR MEDICINE BOW, WYO.

Peugeot Sending Race Team to America

Three French Cars Now on Atlantic Accompanied by Drivers —E. C. Patterson and R. J. Collier Enter Two of Them at Elgin and Also Will Drop Them in at Milwaukee

CHICAGO, Aug. 21—Peugeot, winner of the French grand prix, will contest for racing honors in America, with its first appearance in the Elgin road races of August 30-31, in which it will be entered in the Elgin National Watch Co. trophy race and the free-for-all. From Elgin the team will jump to Milwaukee for the grand prix and Vanderbilt cup races.

A cablegram received by Paul Lacroix, American representative of the Peugeot, announced Monday that the three cars that raced in the French grand prix were already on the water, accompanied by three drivers, with the intention of taking part in the American road races. It is anticipated that they will reach New York Saturday and be shipped immediately to Chicago, reaching Elgin on Tuesday, which will give a couple of days for practice. Just who the drivers are is not known, but it is anticipated that they are Boillot, winner of the grand prix, and Goux and Zuccarelli.

Following this cablegram, E. C. Patterson, of Chicago, and R. J. Collier, of New York, who started the movement to import the Peugeots, agreeing to be sponsors for them in the American races, made four entries in the Elgin road races—each being represented in two races on the second day. The third car also will be entered by Mr. Patterson as soon as he is notified by Mr. Lacroix that this can be done. These entries are made provisional on the cars getting here in time, which seems most likely now. If the cars race at Elgin both Mr. Patterson and Mr. Collier will enter them at Milwaukee also.

The French dressing given the Elgin races adds greatly to the international flavor of the big contests which are being promoted by the Chicago Automobile Club and the Elgin Automobile Road Racing Association, for already nominated are the Fiat of Italy, and the Benz and Mercedes of Germany, while the American representation consists of the Knox, National, Stutz, Mercer, Mason, Falcar and Herreshoff.

The roll call of drivers engaged shows a rare lot, consisting of the French trio, Teddy Teztlaff, Erwin Bergdoll, Ralph Mulford, David Bruce-Brown, Hughie Hughes, Spencer Wishart, Harry Endicott, Len Zengel, Billy Knipper, Charley Merz, Gil Anderson, George Clark, Neil Whalen, W. G. Wordingham and several others. In the case of Bruce-Brown, his starting hinges on his closing a deal with E. E. Hewlett, of Los Angeles, for the same Fiat which he drove at Savannah last fall. Bruce-Brown's car which he drove in the French grand prix was not shipped from Italy until today, so there is no chance of it getting here in time. As Hewlett has all three of his cars at Elgin now, there seems to be no doubt but what he will come to terms with the two-time winner of the American grand prix.

Work on the course is progressing rapidly and unless it rains the rest of the week, which seems unlikely, it will be in shape by Saturday. Practice, however, will not start until Monday. Several of the camps already have been established, the Fiat, Mercer and Mason being here already.

EUROPE READY FOR ANOTHER RACE

Paris, Aug. 10—The second edition of the grand prix race will be held near Le Mans on Monday, September 9, under the control of the Automobile Club of the Sarthe. Sixteen entries have been received, the cars being three Lion-Peugeot, four Schneider, three Arrol-Johnston, three Calthorpe, two Crespelle, and one Bugatti. Owing to an error the foreign entry blanks gave the date of closing as August 15; it is thus possible that other English cars will be seen in the race at Le Mans.

The race is open to cars having a cylinder area of not more than 3 liters, or 183 inches, there being no restriction as to weight. The distance will be about 450 miles over a short, fast course. The Lion-Peugeots are the models built for the Dieppe race, and are practically replicas of the big car which won that event. They will be driven by Goux, Zuccarelli and Rene Thomas. Three of the Schneiders are poppet-valve models similar to those competing at Dieppe and in the Belgian grand prix. The fourth is the firm's 1913 type of valveless motor, which was built for the Dieppe event, but had to be kept back owing to lack of preparation. Bugatti, who has a high reputation in Europe, has built one 3-liter car, declared to be exceptionally fast, and which will make its debut in the races at Le Mans.

Several requests having been made for an unlimited powered class, it is quite possible that the committee will decide to create one. If this is done, Wagner's Fiat, which finished second at Dieppe and has been bought by an amateur, will be entered; the Dietrichs also will be entered and Mercedes entries are promised for such a race.

If the big-car race is decided on, all cars will run together, but the 3-liter models will be given sufficient start to assure the finishes taking place at about the same time.

CAPTAIN E. L. FERGUSON IN COMMAND OF ALCO TRANSCONTINENTAL RUN

BURMAN RACES AT ALBANY

Albany, N. Y., Aug. 19—Bob Burman in his Blitzen Benz raced 1 mile in 1:12⅘ on the two-lap track at Parr's Island here Saturday afternoon before 5,000 spectators. Summaries:

Three miles, Albany drivers—Dodds, Stutz, won, time 5:40; Earle, Jackson, second; Cannon, Cole, third.

One mile, for record—Burman, Blitzen Benz. Time, 1:12⅘.

Three miles—Burman, Cutting, won, time, 4:09⅘; Kyle, White, second.

Three miles, non-stock—Burman, Ohio, won, time 4:20; Kyle, White, second; Hickman, Mercedes, third; Grennon, Benz, fourth.

Three miles, non-stock—Burman, Cutting, won, time 4:07⅘; Kyle, White, second.

Three miles, non-stock—Burman, Ohio, won, time 4:18⅘; Hickman, Mercedes, second; Kyle, White, third; Grennon, Benz, fourth.

Three miles, non-stock, free-for-all—Kyle, White, won, time 4:45⅘; Burman, Cutting, second; Hickman, Mercedes, third.

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Lack of Stock Car Contents

CONTESTS this year have been characterized by the few stock car events scheduled. This has been due to the lack of activity on the part of the Manufacturers' Contest Association and the Contest Board of the American Automobile Association in pushing the stock car program. During the past winter a general spirit of discontent was engendered in certain contest circles with stock car events on the ground that car makers did not want them and would not support them. The stock car event was blamed generally for everything from the lack of entries in a reliability run to the low ebb of interest in a track meet. The last few months have proven that the lack of interest in many contests has not been due to stock car restrictions, because where the stock car clauses have been cast aside and free-for-all stipulations used instead there has not been any improvement in the entries or in the interest. In not a few events the tide is turning again to stock products and there has been a healthy inquiry for stock car registrations and stock car events.

NOT a few makers argued that stock car events would not endure because as soon as one maker established the greater speed or reliability of his machine over that of his rival that the defeated party would refuse to compete further. The same has proven true in the free-for-all field and it has been demonstrated within the last month or 2 that when a maker of a free-for-all car gets emphatically defeated by a rival he refuses to enter in other events until such time as he can get a new model out with which he hopes to win. The fact is that stock car racing will endure longer than free-for-all types with the car maker and in this light it must be remembered that much of the racing of this year is not manufacturers' racing at all, but merely racing by enthusiasts who have bought fast machines and engaged drivers to pilot them. These enthusiasts are not in anywise interested in the car from an advertising viewpoint, but solely from a sporting point, the result being that but a very small percentage of the 1912 racing has been backed by the car makers or represents honestly the products that are being marketed today. As a result the racing of this year means little to the spectator who attends with a view of studying the relative merits of the competing cars. Over 50 per cent of the machines are models that never have been on the retail market and the other 50 per cent are of models that incorporate a few stock parts but which are largely made up by the driver's conceptions of what a racing machine should be. Imported parts figure in not a few machines of domestic manufacture and practically all of the foreign machines contesting are special racing models.

UNFORTUNATELY, all of the free-for-all events in the racing field do not aim at drawing attention to any particular phase of car construction. The free-for-all event is the one with the big money prizes and there is not a restriction in these cars. There is not anything that would aid in making car construction better or that would point the way to new features of design. It is merely a misdirected effort with brute strength by way of cylinder size as the only recognized factor. Control of motor sizes and judicious direction by way of restrictions is needed more today in racing than ever before.

Adding Car Weight

MOTOR cars are not so light as they were last year or even the year previous to that. Although country-wide talk has been to make cars lighter and so reduce tire cost as well as general maintenance cost the weight has constantly been rising due to a variety of causes. Bodies are generally larger, being wider, longer and often deeper. In some makes as much as 4 or 5 inches have been added between the dash and the front edges of the front seat; similar amounts have been added in the tonneau. The seat cushions are deeper, the upholstery is heavier and weight added in not a few other ways.

CONSUMERS have demanded demountable rims and in several cars where two extra demountables with complete tire equipment on them are carried the weight added to the car amounts to over 200 pounds. The tops fitted by several makers are heavier and more enduring than those previously fitted. not a few makers are adding trunk racks as general equipment. Scores of makers are adding self-starters, some compressed air, which call for a larger air reservoir, a system of piping and in some cases power-driven air pumps; those using electric systems have added motor-generators in some cases exceeding the 100-pound mark in weight and in addition a heavy battery is added. Gas starters add weight, as do mechanical types. The windshield equipment is now more common; and added to these are tire chains, speedometers, clocks, a full side curtain equipment and many other features, all of which bring the car weight up.

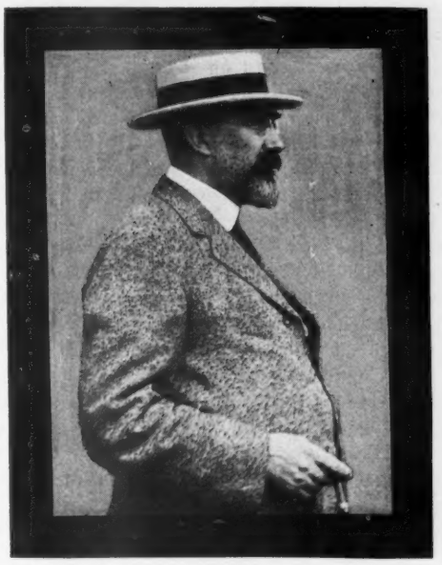
WITH many cars the tire equipment has not kept pace with the increase in weight and often the weights published by the manufacturer are for the car without equipment and while the tires are adequate for the car in such stripped form they are entirely inadequate when the hundreds of pounds of equipment are put in place. A Motor Age subscriber recently was impressed with the rapid wear of his tires and had his car weighed in its touring form to discover if it was under-tired, which led to the discovery that the car weighed over 600 pounds more than the weight announced by the maker and was entirely under-tired. The experiences of this subscriber would be duplicated in thousands of cases throughout the country if the owners would only take a few minutes and have their machines weighed, in full touring form with gasoline tank filled, extra rims and tires, robes, tools and all other requisites. The car should be weighed empty with both front and rear wheels on the scale platform and should also be weighed with the front wheels resting on the middle of the scale platform and the rear wheels off the platform, followed by weighing with the rear wheels on the platform and the front wheels off. This weighing program can be duplicated with the touring load of four or five passengers. When so weighed the owner should check the load on each wheel with the permissible load for the tire size as stipulated by the tire maker whose tires are used on the car. It is almost certain that in over 50 per cent of the cases the tires will be found to be overloaded.

Hingham Abolishes Its Speed Traps

Massachusetts Town Insists Upon Uniformed Police Officers

BOSTON, Mass., Aug. 17—As a result of a crusade backed by the Hingham Motor Club, assisted by a citizens' committee, all motor owners, who called a special meeting and without mincing words attacked the plan of Chief of Police James in conducting motor traps, the selectmen of the town voted unanimously to instruct the chief to abolish them and in their stead place his officers in uniform on the streets to direct motor traffic. One of the effective rods used also was the editorial of Miss Floretta Vining, owner of the Hull Beacon, who criticized the police force in these words:

"Motor car traps are to be a thing of the past in Hingham. The selectmen have unanimously voted that the chief of polite shall discontinue them, and as they appoint him to office there is no reason why they should not see that this is carried into effect at once or else get a new chief that will respect the wishes of the people. There hardly is a citizen in town who does not want to see the heavy traffic on our streets on a Sunday regulated as it should be by traffic policemen in uniform, and why any public servant should so insistently disregard the wishes of the people who pay him his salary, and continue a practice which is obviously objectionable to all the best people in town, and in direct violation of the vote of the selectmen who appoint him to office, it is hard to conceive. Our police force is in the best shape it has ever been in its history, and the men make a fine appearance when dressed in their uniforms. This is largely due to the work and management of Chief James, who took charge of the force when it was a joke and has brought it up to its high state of efficiency. The one blot upon its record has been its persistent persecution of motorists, bringing disgrace upon the town, and making Hingham one of the last towns in New England to do away with the trapping system. With this notoriously disagreeable habit thrown into the discard, and with the chief and his men regulating the traffic, which will be in keeping with the manly and businesslike appearance which they make when on the street, Hingham's police force will be a source of congratulation and credit to every citizen of the town."



THE LATE H. F. DONALDSON

DEATH OF H. F. DONALDSON

New York, Aug. 15—Henry F. Donaldson, president of the Society of Automobile Engineers and member of the firm of Donaldson & Tracy of this city, consulting engineers, was found dead in his apartments in this city today, death having occurred 2 or 3 days earlier, due to a bullet wound in the left breast and also in the temple.

Mr. Donaldson was a pioneer in trade press publication work in America, having entered the field of marine engineering publications work years ago. He was at one time editor of the Automobile and was editor and part owner of the Commercial Vehicle until last fall when he disposed of all of his holdings just previous to the European visit of the Society of Automobile Engineers, on which trip he was a leader. He remained abroad for several weeks after the return of the other members of the party and on his return busied himself with laboratory work connected with his firm of Donaldson & Tracy and also devoted his energies to the Society of Automobile Engineers, of which organization he was elected president at the January meeting. After his election he proved one of the most active presidents that the society has known and devoted much time pushing the various activities of the organization. Mr. Donaldson was 45 years old and one of the highest respected citizens of the motoring field. As a consulting engineer his estimate of a problem was accepted as an authority. The council of the Society of Automobile Engineers met today and passed the following resolution on the death of President Donaldson:

Resolved, That the Society of Automobile Engineers, through its council, greatly deplores the death of its president, Henry F. Donaldson, whose capable and energetic work for the society during the past year is widely recognized and who was respected and beloved by all of his associates for those brilliant attainments of mind and sterling qualities of manhood that raised him above the ordinary level of mankind, making him a natural leader and an unwavering advocate of that which was right and noble and generous; and be it further

Resolved, That the society extends its deepest sympathy to his immediate family and other relatives in their grief over their great and irreparable loss.

Coming Motor Events

August 25—Track meet; Columbus Auto Club, Columbus, O.
August 25-28—Short distance race; Boulogne-Sur-Mer.
*August 30-31—Elgin road races; Chicago Automobile Club; Elgin, Ill.
September 1-3—Ostend meet.
September 2—Track meet at Winnipeg, Canada.
September 3-6—Chicago Motor Club's truck demonstration.
September 8-25—San Sebastian Rally.
September 9—French Grand Prix; Le Mans, France.
*September 9-12—Commercial vehicle run; Chicago Motor Club.
September 11-14—Third annual reliability run of Automobile Club of Buffalo, Buffalo, N. Y.
September 14-21—Annual fall show; Chicago Automobile Trade Association.
September 17 — Grand Prix; Milwaukee, Wis.
*September 20—Wisconsin challenge and Pabst Trophy races; Milwaukee, Wis.
*September 21—Vanderbilt road race; Milwaukee, Wis.
September 17-20—Fire engineers' convention; International Association Fire Engineers, Denver, Colo.
September 25-October 6—Agricultural exhibition and plowing matches; Bourges.
September 30-October 5—American Road Congress; Atlantic City.
September—Track meet; Universal Exposition Co., St. Louis, Mo.
October 4-5—Track meet; Sioux City Auto Club, Sioux City, Ia.
October 6—Gaillou hill climb.
*October 7—National tour Detroit to New Orleans; American Automobile Association.
*October 7-11—Chicago Motor Club reliability run, Chicago.
October 12—Track meet; Rockingham park, Salem, N. H.
October 24-25—Banta Trophy Team match, Chicago Motor Club.
November 2-3—Splash guard competition; Versailles.
November 6—Track meet; Shreveport Automobile Club, Shreveport, La.

*Sanctioned by A. A. A.

SHOWS

September 23-Oct. 3—Rubber show, Grand Central palace, New York.
September 26-Oct. 6—Exposition agricultural motor cars, Bourges, France.
October 2-12—Fire show, Madison Square Garden, New York.
November 8-16—Olympic show; overflow November 22-30 Agricultural Hall.
December 7-22—Paris salon.
January 6-11, 1913—Cleveland show.
January 4-11—Montreal show.
January 11-18—New York pleasure car show; Automobile Board of Trade; Madison Square Garden and Grand Central Palace.
January 11-22—Brussels, Belgium show, Centenary Palace.
January 20-25—New York truck show; Automobile Board of Trade; Grand Central Palace and Madison Square Garden.
January 20-25—Philadelphia show.
January 27-Feb. 1—Detroit show.
February 1-8—Chicago show.
February 10-15—Minneapolis show.
February 17-22—Kansas City show.
March 3-8—Pittsburgh show.
March 8-15—Boston show.
March 17-22—Buffalo show.
March 19-23—Boston truck show.
March 24-29—Indianapolis show.

Shortage of Freight Cars Threatened

Railroad Issues Warning to American Motor Industry at Large

CHICAGO, Aug. 19—Prospects of a serious car shortage during the coming winter are imminent and threaten to tie up shipments of motor cars and accessories to a more serious extent than during the past few years. All the railroads are looking forward to an enormous quantity of traffic and believe that their facilities will be taxed to their utmost during the next few months.

The American Railway Association's record shows a decrease of 12,412 in the available cars during the past 2 weeks, and the season of the heavy crop movement is just beginning. Motor car makers along with other shippers can do much toward relieving and preventing the threatened shortage by following three simple rules:

Load cars as soon as possible after being placed.

Load cars as near capacity as possible.

Hurry unloading of cars to make another empty.

The Pennsylvania railroad has instructed all of its freight solicitors to urge shippers to assist the railroads in their efforts to prevent any car shortage. The importance of prompt loading and unloading of cars is being impressed upon shippers, who also are being asked to cooperate with the railroads to prevent any congestion of traffic. The Pennsylvania, in pursuance of its policy in such cases of taking early steps to preclude, if possible, any likelihood of a car shortage on its lines, is advising its patrons to have freight ready for loading when cars are placed on sidings, and is urging them to load all cars as near to capacity as practicable, in order to get the greatest possible service out of each car used.

The prediction by the Pennsylvania of a heavy fall traffic is especially interesting at this time, following, as it does, a statement just issued by W. A. Garrett, chairman of the Association of Western Railways, in which he makes an appeal to industrial traffic managers and commercial organizations. Mr. Garrett says:

"The time is here for the railways and shippers of the United States to begin active and energetic preparations to prevent a car shortage. The indications are that if they do not begin such preparations at once they will be confronted next October with the worst situation that has existed since October, 1907, just before the panic. No railway man or shipper needs to be told what that situation was. Railway facilities were inadequate to move the business. Yards and terminals were congested, and heavy loss to the railways, the shippers, and the public resulted.

"Conditions that are likely to cause a heavy demand for, and a rapid reduction in the supply of cars exist today. The amount of traffic handled varies greatly during different parts of the year. During about 4 months, beginning around October 1, there are apt to be shortages. This is owing chiefly to the fact that that is the season of heaviest crop movement. Now, the crop prospects in the west this year are unusually good. That helps to make the prospect of a car shortage unusually bad.

"If the bad situation now threatening is to be averted, the managers of the railroads must have the hearty support and co-operation of the shippers and consignees of the country. The shippers and consignees can give such support and co-operation in at least two ways: By moving all lumber, coal, cement, and other freight that they can within the next few weeks, instead of delaying and throwing it all on the railways when they are staggering under the crop movement.

"Shippers and consignees can greatly help themselves, the railways and all other shippers and consignees, by loading and unloading all cars delivered to them as expeditiously as practicable. Every time the loading or unloading of a car is needlessly delayed, the available supply of cars is needlessly reduced; and no shipper has any right to complain that he is not furnished enough cars, if he is, by his own acts, needlessly and wrongfully reducing the available supply of cars. Commercial organizations cannot render a better service to their members than by urging on them the need for prompt loading and unloading. Cars are furnished for transportation, not for storage; and every one used for storage reduces the number available for transportation.

"There has been a great deal of talk in recent years about the need for better co-operation between railways and shippers. Here is a matter regarding which they can heartily and energetically co-operate to the very great gain of both."

TO INVESTIGATE PATENT OFFICE

Washington, D. C., Aug. 17—The passage by the senate this week of the Bulkeley joint resolution providing for an investigation of the patent office means that from now till December President Taft's economy and efficiency commission will be engaged in going over the patent office with a fine-toothed comb. Dr. F. A. Cleveland, chairman of the commission, estimates the investigation will cost $10,000. First, a descriptive report, in detail, of the administration of the office, including present methods, personnel, equipment, building, etc., will be prepared. Hearings will be conducted, at which what Dr. Cleveland calls "the critical and constructive views" of members of the patent bar, patent office officials, etc., will be ascertained. The rest of the work of the commission will consist in digesting the information thus obtained and preparing for congress recommendations as to changes in law, increase in appropriations, additional buildings, etc.

The patent office has done excellent work for the industries of the country. In some respects it is behind the times, both as to methods and equipment. Its profits are large enough to provide for a thoroughly up-to-date office and organization, while the laws governing the granting and working of patents should be revised to meet the demands of modern business.

The work of the commission will be watched with more than ordinary interest by the motor car and accessory industries, which contribute thousands upon thousands of dollars to the coffers of the government every year in patent fees.

RAIN HELPS NEBRASKA CROPS

Omaha, Neb., Aug. 19—Recent heavy rains throughout the whole of Nebraska are causing the most optimistic feelings among the dealers of Omaha. Managers who were out in the state last week reported that they believed that the crop of corn would be 30 percent larger than it was last year. Winter wheat, also, one of the big Nebraska crops, is running as big or bigger than last year. Because of this the dealers anticipate a heavy fall trade in motor cars. They figure that the farmers, backed by their heavy crops, will be in the field strong. Some of the local men are experiencing difficulties in getting the 1913 models rapidly enough, and there have been repeated demands at the sales rooms for information as to when the cars will arrive.

TWELVE IN PLOWING MATCH

Paris, Aug. 10—For the motor plowing competition to be held at Bourges on October 1, 2, and 3, by the Automobile Club of France and the Central Automobile Club, twelve entries have been received, two of these being from American firms—the Case company and the International Harvester Co. The European competitors are Bajac, Delin, Filtz, Foster Gilbert, Hubert-Linard, Landrin, Lefebre, and Vermond-Quellence with two machines. In the motor-driven binder section there are three machines, two of them being entered by the Bauche company and one by De Mesmay.

The Bourges event is not merely a plowing competition but one of the biggest demonstrations of the application of the internal-combustion motor to agriculture that has yet been held in France. It will comprise a display of stationary motors driving various kinds of agricul-

Mais Plant Sold, Company Reorganized

tural machinery, motor trucks for the use of farmers, various competitions for farm mechanics, and a motor fair, this latter being worked on the same lines as the old horse fairs. Every kind of second-hand motor vehicle and accessory will be admitted to the fair, the object of which will be to give agriculturalists an opportunity of securing second-hand machines and accessories at a reasonable price.

CANADIAN RAISES LEGAL POINT

Kerrisdale, B. C., Aug. 17—The interesting defence of J. A. Russell, counsel for R. L. Plumpton, that there is a legal distinction between the speed of a motor car and the rate of speed is to be made the ground of an appeal against the conviction registered against Mr. Plumpton by Reeve Harvey, of Point Grey, recently Decision to appeal the case was reached and the transcription of evidence and the preparation of papers are now being proceeded with.

The point raised by Mr. Russell was that in relation to speed on city, town or village streets, the act specifies that a "greater rate of speed than 10 miles an hour" may not be exceeded, but in the open country the act specifies that no car shall run "at a greater speed than 25 miles an hour." Mr. Russell contends that in the former case the "rate of speed" means that the "rate" at which a motor was traveling might be timed for a short distance, but that in the latter case, where the word "rate" is not mentioned, the timing of a motor would have to be carried out for a space of 1 hour before the wording of the act could be complied with.

In the trial at the Point Grey police court the evidence for the prosecution was supplied by constables who had measured the speed of the car over a measured distance of 220 yards, from which they calculated the speed as being 34 miles an hour.

Mr. Russell argued that the speed "per hour" could only be calculated on an hour's actual running. Reeve Harvey, who presided, ruled against Mr. Russell's argument and fined Mr. Plumpton $10 and costs.

SUES ATLAS ENGINE WORKS

Indianapolis, Ind., Aug. 18—Suit has been brought in the circuit court in Indianapolis by the Minnehaha National Bank of Sioux Falls, N. D., against the Atlas Engine Works of Indianapolis, which is in the hands of a receiver. The action, also directed against Hugh H. Hanna, president of the Atlas works and the United States Fidelity and Guaranty Co., is to collect a judgment for $2696, upheld by the Indiana appellate court last April.

F. H. Wheeler Prominent in Big Indianapolis Motor Truck Deal

INDIANAPOLIS, Ind., Aug. 19—Only one bid was submitted for the purchase of the Mais Motor Truck Co. today and the property was sold by the receiver, Franklin Vonnegut, to Frank H. Wheeler of Indianapolis and Walter N. Pearce and H. G. Francis of Rushville. The purchase price is $71,000 and the sale, of course, is subject to the approval of the court, which is in vacation. Mr. Wheeler declines to give any details as to the future of the company until the sale is approved by the court. Mr. Francis and Mr. Pearce are stockholders in the old company. Mr. Wheeler will control about 50 per cent of the stock.

Besides getting the plant and equipment, the purchaser will get about $12,000 in accounts and $10,000 in notes receivable. One-third of the sale price is to be paid in cash; one-third in 12 months and the remaining one-third in 18 months.

The receiver filed the following inventory in court: Finished stock, including two shop cars and parts in assembly, $26,759.32; car parts, now in process of machining, $6,327.89; car parts in the rough, consisting of rough castings and all unfinished parts, $19,481.55; bar steel, brass and steel tubing, $7,887.17; machinery, $55,236.82; factory equipment and supplies, including all belts, pulleys, motors, starting boxes, etc., $10,778.53; office equipment, $2,784.05; paints, oil, etc., $460.56; patterns, manufacturing cost, $7,804.36; jigs and tools, manufacturing cost, $13,439.67, and real estate and buildings, $30,000. Total $180,959.92.

The receiver expects to have approximately $85,000 to divide among the creditors. The liabilities of the company are said to amount to approximately $250,000.

Following the sale, the Mais Motor Truck Co. was reorganized and incorporated with $1,000,000 capital by the purchasers of the property. Mr. Wheeler, who will hold one-half of the stock, is now president; Walter M. Pearce, of Rushville, is vice-president; Alvin S. Lockard, Indianapolis, secretary and treasurer. Will H. Brown, former president, will continue with the company. The officers and Jacob V. Stimson, Huntingburg, and Harry G. Francis, Rushville, will constitute the board of directors. Most of the old stockholders are in the reorganization. The stockholders in the old company will realize nothing. The new company assumes a $10,000 mortgage on old plant, besides paying $71,000.

WESTINGHOUSE SUIT SETTLED

Philadelphia, Pa., Aug. 16—The legal hostilities between the Louis J. Bergdoll Motor Co. of this city and the Westinghouse Machine Co. of Pittsburgh were finally adjusted and settled, announces the Bergdoll company, when full satisfaction was entered yesterday on the records of court of common pleas No. 4. In May of 1910 the Westinghouse company contracted to build for the Bergdoll company 1,000 gasoline motors to be delivered at the rate of not fewer than 100 per month. After receiving and paying for 600 of the 1,000 motors the Bergdoll company declined to receive or pay for the balance, alleging as its reason failure on the part of the Westinghouse company to make deliveries as agreed, and consequent losses in sales of cars in the construction of which the motors in question were to be used. As a result the Westinghouse company brought the above action. By the terms of settlement the balance of the motors are to be shipped to the Bergdoll company as its needs require.

FALL SHOW IN CHICAGO

Chicago, Aug. 19.—Plans have been made by the Chicago Automobile Trade Association for its annual fall festival which has been scheduled for the week of September 14-21. In reality this is to be a street show, with Michigan avenue lighted at night, all the stores decorated and the 1913 models on view. As attractions there will be parades and other affairs which will bring out the prospects. The opening night there is to be a parade of commercial vehicles, which will include those machines which have taken part in the Chicago Motor Club's demonstration, which has been scheduled for September 10-13. On Monday night there is to be a parade of electric vehicles. On Tuesday, fire prevention day, there is to be a display of municipal motor vehicles. Old cars will parade Wednesday.

FISHER BUYS ESTERLINE CO.

Indianapolis, Ind., Aug. 21—Carl G. Fisher and James A. Allison, of the Prest-O-Lite Co., of this city, have purchased a one-half interest in the Esterline Co., Lafayette, Ind., manufacturers of the Berdon electric lighting system. The price paid is $150,000. The other half of the new organization is in the hands of the original owners of the company who traded in the original company for $75,000 and put in $50,000 additional cash. The former management will be continued and it is expected that Messrs. Fisher and Allison will occupy nominal positions in the reorganization, which will be completed this week.

Orders have been booked for over $1,000,000 worth of Berdon lighting apparatus for the 1913 season. The present officers are: J. Walter Esterline, president; E. S. Ferry, vice-president, and W. Bent Williams, secretary-treasurer.

Marmon Winner of Winnipeg Reliability

Clean Score This Time Gives Car the Minneapolis Journal Trophy

MINNEAPOLIS, Minn., Aug. 17—With the Marmon entry, No. 1, victor in the touring car class and winner permanently of the Journal trophy, the fourth annual tour of the Minnesota State Automobile Association, its first international tour and most eventful run of its history, ended Thursday noon.

Eight cars remained in the running at the close. The Cutting and McFarlan did not appear at the start, the Staver withdrew at the end of the second day and continued as official car. The pilot, pacemaker and press car stayed through. One of the non-contestant cars, that of President H. J. Clark, was abandoned in the mud at the end of the first half of the third-day run. The other non-contestant, Dr. H. G. Blanchard of Waseca, Minn. ,ran through, although breaking three springs, an axle and having some tire trouble.

Owing to closeness of the record of the Hupmobile and the Studebaker car driven by W. H. Soules, the decision as to the award of the Daily News trophy for the runabout class has been left to the national contest board. The unofficial points are 22 for the Hupmobile and 21 for the Flanders.

The second half of the 7-day run was much easier on cars and drivers than the up trip. A large part of the distance in North Dakota was over the Meridian road which is in fair condition. The route from Winnipeg to the border at Emerson was on the east side of the river and far superior to the north bound road which was one of the worst found in the first 3 days of the endurance run. At Emerson a short trip was made west to Pembina, where the cars were cleared at the United States customs house.

While it was discovered that the north route through the middle part of the state and the White Earth reservation is not yet ready for persons who want easy touring, a perfectly feasible road was discovered returning to Minneapolis. A great part of the road is posted. The whole length of the Meridian road had two signs at each corner and slow signs on bad turns. This made the work easy for the pilot as well as the pacemaker. At intervals a short cut had been made by the pathfinder, usually along the right of way of a railroad, which always resulted in a disagreeable run, owing to the recent rains in the district. Most of the mire holes encountered were on these detour roads, owing to the fact that the railroad being high acts as a dike and causes the water to stand in the gumbo soil.

The first dust encountered was in the sandy soil the last day as the route neared Minneapolis. Some fine roads exist in the vicinity of Fergus Falls and Alexandria, favorite touring spots. Wilkin county, however, between McCauleyville and Breckenridge and between Breckenridge and Foxhome, appears to have the lead for the Automobile Club of Minneapolis good roads bronze statue, hitherto in possession of Renville county, won in 1910. The reason for the award will be that the roads are consistently smooth and with good connections at culverts and bridges. Absence of chuck holes also moved the chairman of the good roads committee, Louis Koch, to decide for Wilkin. Douglas county, in the famous park region of the state, has excellent and well dragged roads, but occasional chuck holes worked in favor of Wilkin, which is newer in road work.

The return route from Winnipeg being the older one, is more traveled than the western road. More motor cars owned locally were met and more international tourists were encountered. The scenery on the return trip is perhaps more beautiful, yet to the tourist who likes wild and untouched nature the eastern route through the Indian reservation will appeal strongly. It transpired on the trip that the offer of the club trophy had resulted in much road work by the traversed counties and in an advance in road making methods due to the publicity of standard road building rules.

Motor car dealers on the tour were encouraged to believe there is to be a good mark in their line for the 1912-1913 season, owing to the tremendous crops already harvested and being threshed; and to the interest taken at all controls in the merits of the various entered cars. The parked machines were the center of inquiry at every control and as a rule every town turned out its large quota of citizens to watch the travelers through their limits.

MARMON, PERMANENT WINNER OF MINNEAPOLIS JOURNAL TROPHY

Two cars went through without mechanical troubles, the Marmon with perfect score, the Cadillac with many penalties, but mainly for broken spring work.

The tire record shows as follows: No. 1, four Goodrich tires, no trouble; No. 2, Goodyear tires, two blowouts, nine punctures, all rear tires; No. 3, Studebaker, two Firestone tires in front, two Morgan & Wright in rear, three inners in front tires; No. 5, two Millers in rear, two blowouts, one Goodyear and one Hartford front, no trouble; No. 7, same Kelly-Racine used on pathfinder trip, all blew out, altogether three blowouts and eight punctures; No. 8, Kelly-Racine, one puncture, one blowout; No. 9, Kelly-Racine, one blowout, two rear punctures; No. 11, Goodyear, six punctures, three blowouts; No. 12, Goodyear, old tires, one puncture and one blowout, came in on Michelins; Brictson press car, Pierce-Arrow, four Goodrich tires covered with Brictson treads, same air as in the 1911 Glidden, no trouble. Paige, pilot, Kelly-Racine tires, no changes; pacemaker Stoddard-Knight, Hartford and one Goodrich, two blowouts and four punctures.

BUFFALO ROUTE BLAZED

Buffalo, N. Y., Aug. 20—The pathfinding crew for the third annual reliability run of the Buffalo Automobile Club, to be made September 11-14, completed its labors Friday night in the Studebaker 30 car which was sent from Detroit for the work of mapping out the course to be taken on the annual run. In the 4 days consumed for the completion of the course

OFFICIAL SCORES OF THE WINNIPEG RUN OF THE AUTOMOBILE CLUB OF MINNEAPOLIS

	1st Day			2nd Day			3rd Day			4th Day			5th Day			6th Day			7th Day			Total Penalties
	Road	Time	Work	Road	Time	Work	Road	Time	Work	Road	Time	Work	Road	Time	Work	Road	Time	Work	Road	Time	Work	
Marmon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*Hupmobile	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	22
*Studebaker 20	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	21
Cadillac	0	0	0	0	0	0	0	32	1	3	0	320	0	7	280	0	0	0	0	0	0	643
Mitchell	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	130	61	3	0	0	197
Paige-Detroit	8	0	1	20	0	1	3	77	34	6	0	59	12	0	0	0	0	23	3	0	0	247
Warren-Detroit	0	0	0	0	0	0	0	14	1	0	0	273	9	0	18	0	0	2	0	0	0	317
Reo	0	0	0	36	0	1	6	0	0	4	0	3	3	0	0	15	0	0	0	0	0	68

*Referred to A. A. A. contest board

REASONS FOR CAR PENALIZATION

NO. 5—CADILLAC

Third day	32	Late
	1	Work
Fourth day	3	Water
	320	Spring and steering arm
Fifth day	280	Spring work
	7	Late
	643	

NO. 7—MITCHELL

Third day	3	Tight drip pan replace cap on radiator
Sixth day	2	Remove steering arm
	48	Repair steering arm
	1	Adjust magneto
	130	Late
Seventh day	3	Engine stop 2½ min.
	197	

NO. 9—WARREN

Third day	14	Late
	1	Work
Fourth day	3	Spark plug
	270	Spring work
Fifth day	6	Water
	3	Oil
	18	Spring work
Sixth day	2	Tight bolt on spring shaft
	317	

NO. 8—PAIGE

First day	1	Magneto trouble
	8	Engine stop; overheat
Second day	20	Water and shift arm stuck
	1	Clean magneto
Third day	3	Water
	77	Late
	34	Work on magneto
Fourth day	6	Water
	44	Work on crank case
	15	Work on spring
Fifth day	12	Water
Sixth day	23	Broken spring
Seventh day	3	Water
	247	

NO. 11—REO

Second day	27	Engine hot, stop and water
	1	Work
	9	Water
Third day	6	Water
Fourth day	3	Water
	4	Spark plug
Fifth day	3	Water
Sixth day	15	Water
	68	

to be taken, 838 miles were traversed, the pathfinder returning to Buffalo every evening after each day's labor. An average of 210 miles daily was made by the pathfinder.

The route taken by the pathfinder Studebaker was along Lake Shore through Dunkirk and Fredonia to Ripley. Roads along this route were found in excellent shape. At Ripley the crew turned up through Findlay lake territory along Lake Chautauqua to Jamestown. Returning, the pathfinder came through Falconer, Cattaragus, Gowanda, to Hamburg. Buffalo was reached at 10 o'clock Tuesday night, 202 miles having been covered the first day.

Wednesday Buffalo to Warsaw, past the Craig Colony, Mt. Morris, Springwater, to Taber's Corners, through forests to Naples, along the shore of Lake Canandaigua to Canandaigua, N. Y. Returning, West Bloomfield to Noa, Flowerville to Inverness to Buffalo.

The third day was a record-breaker for mileage, 216 miles having been traversed, Buffalo to Olean, through Machias, Ischua, Smithport. Through northern Pennsylvania a combination of roads from rough country roads to modern macadamized roads were encountered on the tour. On this stretch plenty of hill-climbing will be afforded the contestants. The pathfinder returned through Lewis Run, Custer City, Bradford, Salamanca and in this section discovered an old road which is not on the maps. On Friday, the most strenuous run of the week was made, but the pathfinding crew will keep this route secret until Wednesday, September 11, when the reliability run starts.

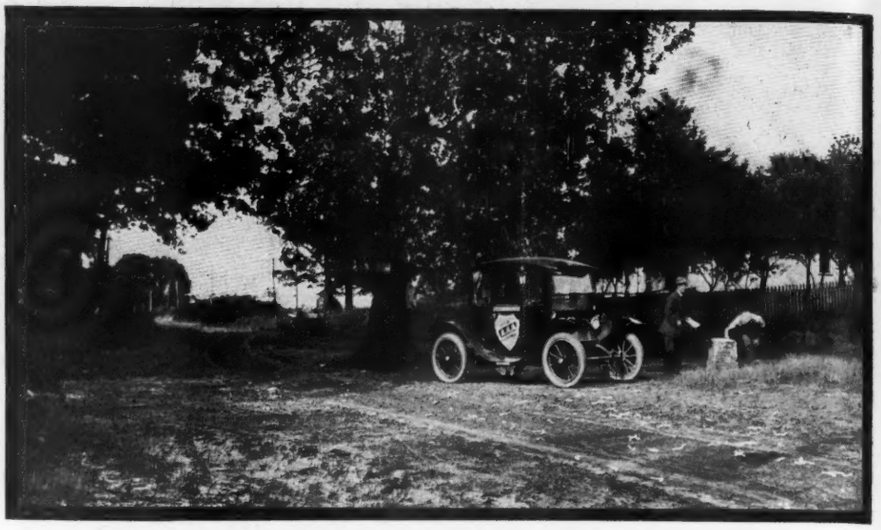
PIERCE-ARROW PRESS CAR IN WINNIPEG RELIABILITY

PARIS TRIES TRAFFIC REFORM

Paris, Aug. 10—Paris is attempting traffic reform on American lines. A scheme drawn up by William P. Eno, an American citizen, is now being put into force. Its most important feature is the establishment of a one direction flow of traffic in certain cross streets and in avenues having some central dividing line. On the big public squares the gyratory system of traffic has been established, and in the Avenue des Champs-Elysees, the most important of the French arteries, the reserving of the central portion to motor traffic only is continued.

In order that drivers may be thoroughly acquainted with the new traffic conditions, a large number of explanatory booklets have been printed and distributed. Although Paris is not laid out with the same regularity as the leading American cities, its conditions lend themselves to the application of the rules enforced in many parts of the United States. The greatest difficulty is met with in the drivers themselves, who lack the discipline of those of other countries and cannot be induced to obey laws without discussion. The French driver's method is to pass through wherever there is an opening regardless of traffic rules.

Pathfinders Meet With Adventures



GLIDDEN PATHFINDERS AT LINCOLN MEMORIAL NEAR BUFFALO, KY.

Scouts Laying Out Trail for National Reliability Find Muddy Roads in Tennessee—General Idea of Route Outlined by Crew of Flanders Electric, Now in South

MEMPHIS, Tenn., Aug. 17—When the pathfinding Flanders electric coupe, which is laying out the route for the national tour of the American Automobile Association from Detroit to the city of New Orleans, reached Memphis it had covered 973.9 miles of the 1,600-mile route and had before it problems that appeared just as insurmountable as did those of the second week of the journey of the Glidden route markers.

From Mammoth Cave to Memphis, a distance of 400 miles, was pronounced an impossible route owing to the heavy rains which have prevailed all through the present year. At Long Muddy creek bottoms, passing along the bank of the creek of that name, the farmers had started to rebuild a levee which had been washed away by the spring freshets, and for a height of 6½ feet had thrown up the water-soaked earth from the side of the road. Along the top of this pile of mud the roadway ran and the pathfinders had to cross to secure the distances for the route maps being prepared by pathfinders. Inch by inch the electric worked its way through, taking 8 hours for the seemingly impossible task. This brought over the pathfinders into pitch darkness, and as the map-maker cannot work at night and indicate cross roads and land marks the party took the tip of some kindly natives and slept in a church on the hard side of hard planks. The inside of the church was in course of construction. In the journey the pathfinders have reached towns regularly with the one exception mentioned.

Part of Route Outlined

From Mammoth Cave to Nashville is 108 miles and the tourist will stop at Bowling Green, 62.5 miles, for dinner. From Nashville to Sheffield, Ala., is 124 miles, and the tourists will stop at Columbia, 43½ miles, for dinner. This will allow a late start from Nashville, as the pike to Columbia is one of the finest roads on the trip to drive over. From Sheffield to Memphis, 1 day's run on the Glidden tour of 2 years ago, will be divided into 2 days' running this year, the night stop out of Sheffield being at Rodgers Spring, with Corinth, 63.4 miles, as the noon stop. Rodgers Spring is a delightfully located health resort with a rustic hotel which is a paradise. This point is 98.8 miles from Sheffield. From Rodgers Springs to Memphis is 70 miles, which will land the tourists in Memphis early on the eighth day of the pathfinding tour.

Delays have been caused in the pathfinding trip by errors in the route as laid down 2 years ago, when the tour went to Dallas, Texas, through much of this route, the necessity of corrections and of arranging for stopping places, noon stops and for gasoline and other supplies for the tourists.

The news that the tour was again coming through this section caused much activity among the farmers in road-building efforts, and the pathfinders struck the country just at the time when miles of roads had been under course of construction for some time, and road building down south means, as a rule, the throwing up of the dirt from the roadside, where it is gradually rolled by traffic.

When the tour comes through the roads will have been made, but the pathfinders were forced to work their way through. The people of the country south of Columbia and east of Nashville have caused many a laugh with the pathfinders, as almost without exception they have been frightened more at the sight of the car than were their horse or mule, which they frequently unhitched, while their women folks and children slid from the vehicles as though their very life depended on it. And the horses seldom moved in their steps.

Detours Through Woods

Where hills have been encountered the rains have washed the surface to such an extent that detours have been cut through the woods, the stumps still standing dangerously high for cars that are hung very low.

The liveliest possible interest in road-building work was found in county after county during the week of travel, and a number of counties had appropriated sums which in the total amount to hundreds of thousands of dollars for the construction of roads. The country was found aroused to the road question, and good roads all along the route will follow as the result of the present pathfinding trip and of the tour itself.

From Memphis the tourists will travel southward through Jackson, Miss., with a detour from that point to Vicksburg and then from Jackson to Baton-Rouge and New Orleans.

Pathfinders at Cruger

Cruger, Miss., Aug. 20—Out of a total of 125 miles covered by the pathfinder Sunday, 101 miles were added to the official route, the other 25 miles are chargeable to re-routing a 12-mile section of the road. Pathfinder Westgard left Lulu, Miss., Sunday morning and made Glenwood without incident, save a series of ovations received along the way and a number of stops occasioned by parties going to and from church and whose horses, unaccustomed to motor cars, showed a great deal of timidity.

Monday afternoon was consumed by a royal entertainment provided by citizens of Glenwood whose hospitality was so enthusiastic that Pathfinder Westgard had not the heart to disappoint them by making the early start he had intended at the first.

Cruger was reached in the afternoon and here another royal reception and entertainment awaited the party. Owing to a washed-out bridge on the route, just beyond this point, the pathfinding party was forced to spend the night at Cruger. In the meantime a temporary bridge is being built and, barring more rain, the indications are favorable for a good run into Jackson.

Massachusetts Attracts the Tourists

GLIDDEN SCOUTS CROSS TENNESSEE STATE LINE NEAR MITCHELL

Comparisons Made in Registration Bureau Shows How Bay State Attracts Visitors—More Than 700 Outside Cars Reported to Have Checked In—New England Profits

BOSTON, Mass., Aug. 17—That New England in general and Massachusetts in particular is the nation's playground in summer is borne out with greater emphasis again this year when the facts and figures relative to motor touring is considered. The section may well be termed by tradesmen the golden trail. This time last year a compilation was made of the visiting cars that were registered in the Bay State under the 3 months clause of the state law just to note where the greater number came from.

Comparison of Figures

Compared with figures gathered today those of a year ago are very interesting. In 1912 up to the middle of August there were about 400 cars belonging to non-residents registered in this state. Today if a person is at all observant one may see that X700 has been reached, the X denoting that the car belongs to an owner spending the summer in Massachusetts.

Of the 400 machines registered a year ago thirty-one states and the District of Columbia were represented. It must be borne in mind, however, that for every car registered here there are scores of machines which are driven into the state for a few days only, and are driven away again before the 10-day limit expires. So that the total number of visitors runs high up in the thousands.

Of the more than 700 cars registered this year there are but twenty-nine states on the list besides the District of Columbia. Some states represented a year ago are not registered this year, but there are four new ones on the 1912 list. Considering all the cars that pass through Massachusetts in summer it is probable that about every state in the union has been represented at some time or other.

A comparison of the figures shows some interesting facts. First of all the increase has been general all along the line, the east showing to greater advantage. This is not strange. New York, the leader of a year ago, still remains in a class by itself and the figures have increased from 121 to 209 cars.

In 1911 New Jersey and Pennsylvania were close rivals, the former with thirty-five and the latter with thirty-four cars. It is a different story this year. Pennsylvania holds second place by a good margin, its figures more than doubling for there are seventy-eight Quaker cars on the list. New Jersey showed a gain from thirty-five to fifty-six.

Missouri Well Represented

Somewhat surprising are the figures for Connecticut and Rhode Island. Last year there were only fifteen Connecticut cars registered to forty-three now, while Rhode Island's twelve has jumped to forty-two. Another state that shows a big gain for Illinois, from fifteen to thirty-nine cars.

Missouri, too, has joined the procession of good representatives, for her figures nearly double, the twenty-one of a year ago running to forty. Ohio also has forty on the list where last season there were only twenty-eight. New Hampshire with but two last year has jumped to twelve and Michigan has nearly doubled with fifteen instead of eight.

Maryland is worthy of more than passing mention, for that state nearly tripled its figures, going from six to seventeen. District of Columbia, that had nine last year, is now higher up with twelve. Virginia with but one car a year ago has five now; Tennessee has six where it had but three; Maine has three where it had but one.

That distance makes no difference to motorists of the present day is shown by the long distances some of them come. For example, California is on the list this year with seven cars. Last year there were none from that state. Texas had three a year ago and this season has eight. Colorado has two where none were registered last year.

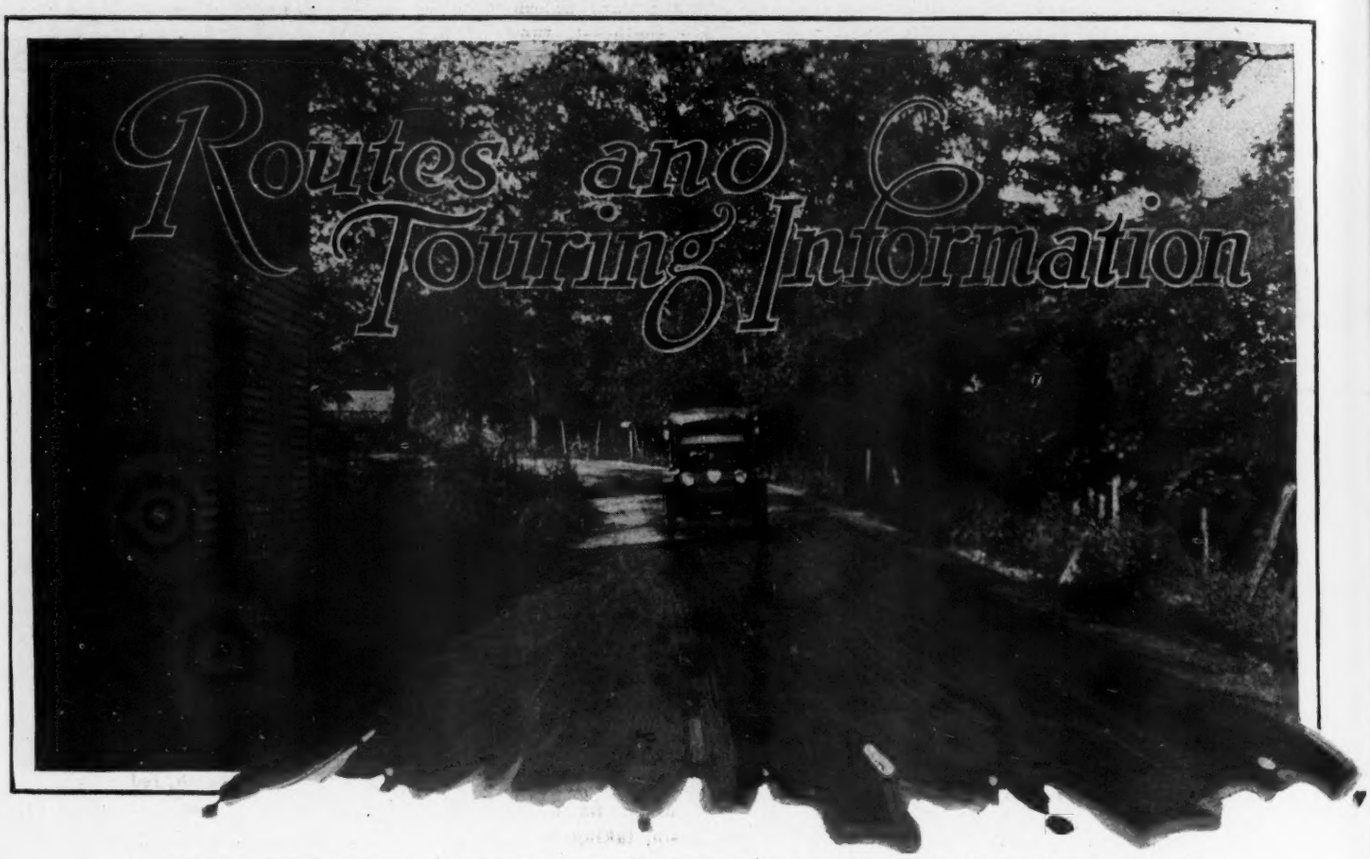
The south is represented by Alabama with two cars, last year three; Florida three, last year two; Georgia one, last year none; Louisiana four, last year two, a very respectable showing. Nebraska four, last season one; Minnesota two, formerly three; Wisconsin one, the same as last year, represent the west beyond the Mississippi very well, not including the Rockies and beyond. Other states include Indiana with a drop from nine to three; Iowa two, the same as 1911; Kentucky four, a gain of two; and Kansas one, last year none. North and South Carolina, Arkansas, Delaware and Washington are off this year's list, the new ones being California, Colorado, Georgia and Kansas.

Cars from Other Countries

For real distance the cars registered from Brazil and Honolulu give evidence that their owners know where to go to enjoy summer life. There was one car registered from each place. Porto Rico had two cars on the list and Cuba had one, while Canada has two. In a number of instances the owners gave their summer residence in the Bay State instead of their permanent residence, otherwise the figures would have been increased for several states, perhaps.

If one were to allow but twenty-five cars here for each one registered, a low figure, it would show at least 17,000 or 18,000 cars were here in summer. However, the figures must be much larger. Allowing an average of three persons to a car it is not too much to say that 50,000 motorists will visit us this year. Going still further into figures and allowing an average expense of but $10 for each one it would mean that Bay State business men would get $500,000, while as a matter of fact the receipts are more likely to be $1,000,000.

Up at Breton Woods, where a compilation of motor touring is kept very accurately, the July figures showed that of 2922 guests at the hotels 1803 reached there by motor cars, 512 machines being garaged there. This is an average of 61.5 per cent.



THE FLANDERS ELECTRIC, PATHFINDER FOR THE NATIONAL TOUR, ON THE BARDSTOWN PIKE, KY.

TOUR THROUGH TO NORTHWEST

NORTHWOOD, Ia.—Editor Motor Age—Kindly advise me of the best route from Albert Lee, Minn., to Sherman, S. D., also from Albert Lee to Madison, S. D.—Reader.

Follow the Blue Book route to Jackson, Minn., through Alden, Blue Earth, Guckeen, Fairmont, Sherburn, and Jackson, a distance of 87 miles. The most direct road to Sherman is through Worthington and Luvern, and on to Madison, passing to the south of Coleman and Wentworth.

COLUMBUS, NEB., TO KANSAS CITY

Columbus, Neb.—Editor Motor Age—I would like the best route from Columbus, Nebr., to Holton, Kans., by way of Parkville and Kansas City, Mo. Also direct route from Holton back to Columbus, Neb.—L. C. V.

The best route to take is to go to Omaha, a distance of 83 miles, passing through Benton, Schuyler, North Bend, Ames, Fremont, Waterloo, Elkhorn, Omaha. Leaving Omaha for Holton, Kan., 161.5 miles, over natural dirt roads, the towns en route are Fort Crook, La Platte, Plattsmouth, Mynard, Wyoming, Nebraska City, Julian, Auburn, Howe, Verdon, Falls City, Hiawatha, Horton, Holton.

From Holton, Motor Age suggests that you go to Topeka, 32 miles, passing through Mayetta and Hoyt. Turning east for Kansas City, 78.6 miles, the towns are: Grantville Station, Perry Station, Midland Station, Lawrence, Endora, DeSota, Bonner Springs Station, Kansas City. Make a side trip to Parkville from Kansas City.

On your return trip from Kansas City you could go to Hiawatha through Piper Station, Wallula, Leavenworth, Lowemont, Atchison, Lancaster, Huron, Everts, Hiawatha, and then return to Columbus, Nebr., over the outgoing trip. However, at Hiawatha, you could vary the return portion by going west to Marysville, thence to Lincoln, Nebr. This route is over rolling country with good roads in dry weather, the towns being Hiawatha, Fairview, Sabetha, Oneida, Seneca, Baileyville, Marysville, Okato Station, Wymore, Blue Springs, Beatrice, Pickerell, Cortland, Princeton, Lincoln. The distance is 149 miles.

From Lincoln go west 58 miles to Fairmont through Emerald, Milford, Friend, Exeter; then north from Fairmont over a portion of the Nebraska division of the Meridian road through York, Stromsberg, Osceola, Shelby to Columbus, Nebr. Volume 5 of the Blue Book gives complete running directions, also other routes in this locality, should you desire to make other detours.

IOWA TO CALIFORNIA

Sioux City, Ia.—Editor Motor Age—Kindly give me the best route from Sioux City, Ia., to Los Angeles, Cal.—E. T. Kearney.

With Omaha, Neb., 109.2 miles, your first stopping point, the towns en route are: Sioux City, Salix, Sloan, Whitney, Onawa, River Sioux, Missouri Valley, Loveland, Reels Store, Crescent, Council Bluffs, Omaha. You will have a good dirt road as far as Sioux River, and the next 6 miles in wet weather is bad. For the balance of the route see communication in August 15 issue, page 24, headed "Long Trip Planned."

SIOUX CITY TO OKLAHOMA CITY

Sioux City, Iowa—Editor Motor Age—Please give me the best route from Sioux City, Iowa, to Oklahoma City, Okla., by way of Dewey, Okla.—E. C. Craig.

This will be a trip almost due south across two states and into a third state, and should be a delightful one, as it follows for some distance along the bluffs and in the valley of the Missouri river. Enroute to Omaha the principal towns passed through will be Salix, Onawa, River Sioux, Missouri Valley, Crescent and Council Bluffs.

Crossing the river at Omaha you will run through Fort Crook, Plattsmouth, Nebraska City, Auburn, Falls City, Hiawatha, Highland, Manning, Troy, Wathena, to St. Joseph; thence through Rushville, Atchison, Lowemont and Leavenworth to Kansas City. There is a shorter road from Hiawatha via Everts, Huron and Lancaster to Atchison, but it is bad in wet weather as far as Huron; and perhaps you would wish to go through St. Joseph anyway. Leaving Kansas City the wayside points will be Olathe, Wellsville, Ottawa, Garnett, Colony, Iola, Humboldt, Chanute, Thayer, Cherryvale, Liberty, and Coffeyville. Shortly beyond

Coffeyville you will digress from the main road to reach Dewey, but, as it is in the adjoining county, local information can be obtained regarding the towns enroute.

Resuming your journey, at Bartelesville you can get running directions to Collinsville; proceeding thence to Owasso, Tulsa, and Muskogee. At this point turning west via Boynton, Morris, Okmulgee, Sharp, Okemah, Bearden, Shawnee, Newalla, and Marion to Oklahoma City. Some rough stretches of road may be looked for in Oklahoma, although the people of the state are keen on the good roads subject and are improving their highways as rapidly as possible.

CHICAGO TO CLEVELAND

Milwaukee, Wis.—Editor Motor Age—Kindly give me the best route from Chicago to Cleveland, O.—T. W. Davis.

From Chicago to Cleveland your best route will be through Whiting, East Chicago, Hessville, Highlands, Schererville, Merrillville, Valparaiso, LaPorte, South Bend, Goshen, Ligonier, Kendallville, Bryan, Archbold, Ridgeville, Napoleon, Liberty Center, Bowling Green, Woodville, Fremont, Clyde, Sandusky, Huron, Lorain, entering Cleveland via the boulevard and Edgewater Park.

WILL VISIT THE HOOSIERS

LaFayette, Ill.—Editor Motor Age—Please give me a route from Toulon, Ill., to Jeffersonville, Ind.—Ross Shockley.

Reaching the main traveled road at Galva, turn southwest toward Galesburg, then angling to the southeast, running through Maquon, Farmington, Peoria, Tremont, Bloomington, passing just north of Gibson City, and on through Hoopeston, Oxford, LaFayette; then bearing more to the south via Frankfort, Indianapolis, Franklin, Columbus, Seymour, Crothersville, Henryvilie to New Albany; thence running east along the Ohio river to Jeffersonville.

ROUGH ROAD TO MAMMOTH CAVE

La Salle, Ill.—Editor Motor Age—In reference to routing from Decatur, Ill., to Bowling Green, Ky., in Motor Age, issue of August 8, would say no motor car should go beyond New Haven, Ky., on to Mammoth Cave, as the pike, as they call it down there, is nothing more than about 50 miles of jagged rock and would destroy the best set of tires that could be put on a car. Motor Age would do tourists in that section a great favor by halting them at New Haven, and advising taking the railroad in making a trip to Mammoth Cave, Ky. The writer made this trip about July 20 this year and was tempted to write Motor Age of road conditions at that time. —A Subscriber.

WANTS A WISCONSIN ROUTE

Chicago—Editor Motor Age—Starting at Lake Geneva, what would be a good week's tour in Wisconsin, taking in, say, a half a dozen to a dozen resorts, as Madison, Waukesha, Oconomowoc, etc.? I would not wish to go over 100 miles a day, or stop at night at poor hotels.—Hollis E. Potter.

For a leisurely trip, such as suggested, Wisconsin is well chosen, and even less than 100 miles will sometimes be the portion for a day in order to not exceed 100 miles per day yet have at night the most advantageous stopping place.

Starting toward the west in the morning of the first day, having thereby the sun at your back, let your journey be through Delavan and Emerald Grove to Janesville for the noon stop. Angling to the northwest from this point pass through Edgerton, Staunton and Lake Waubesa Station to Madison, a distance in all of about 78 miles. This is a short day's run, but it gives opportunity for enjoying some of the many delightful drives in and about Madison.

With the intent of reaching the west shore of Lake Winnebago, the second day's journey might be through Sun Prairie, Columbus, Beaver Dam, Waupun, Brandon, Ripon, Green Lake and Berlin to Oshkosh, the mileage in this instance reaching 112 miles. But if this is greater than desired, it is not necessary to run into Green Lake, but, turning northeast at Ripon, pass through Picketts to Oshkosh, reducing the distance to 95 miles.

Along the western side of Lake Winnebago run north from Oshkosh via Neenah, Appleton, Kaukauna, Wrightstown and De

Late Road Reports for the Mototists

The Blue Book car reports the following conditions on new and old routes:

Chicago to Joliet. The car went down Halsted street and Vincennes road to One Hundred and Eleventh street, Morgan Park, where it turned west, following the direct road to Sag Bridge in Lemont. The road is pretty good to Lemont, being only fair the rest of the way to Joliet.

Joliet to Kankakee via Manhattan, Wallingford and Manito is a new route. It is practically all dirt road. Although fairly good in dry weather it would be poor after rains.

Another new route, Momence to Morocco, makes a connection between the Chicago-Momence route into eastern Indiana. The road is not very good, with quite a bit of sand to Lake Village; from there on it is good.

Chicago to Danville is a new route. As far as Morocco this coincides with present routes 11 and 16. Leaving Morocco the new route is straight south through Kentland and then to Danville via Raub, Freeland, Ambia and Hoopeston. The crew reports excellent road conditions all the way.

Attica to Terre Haute. This in connection with route 16 will make almost a straight line from Chicago to Terre Haute as it is almost directly south from Attica through Rob Roy, Veedersburg, Yeddo, West Union and Armiesburg. On fine gravel all the way with some very attractive scenery.

Terre Haute to Vincennes. The crew found the regular Blue Book route to be not only the best, but in excellent shape.

Terre Haute to Bloomington via Bowling Green, Vandalia and Ellettsville is a new route. This is a pike road most of the way and although hilly, in some few spots a little rough. The scenery is very attractive.

Bloomington to Columbus is a new route. It is pike practically all the way; easy to follow but it is quite hilly and very winding. Some of the hills are quite rough with several small fords. The scenery is well worth the trip for those who are not afraid of a little rough road.

Columbus to Greensburg via Hope and Burney is a new route. This is fine gravel all the way.

Indianapolis to Madison via Shelbyville and Greensburg is a new route, most of the way on what is still known as the old Michigan road. Good gravel and stone practically all the way.

Madison to Cincinnati via Rising Sun and Lawrenceburg is a new route. There are surprisingly good road conditions for this section with some beautiful scenery, especially near Rising Sun. In making this connection to Lawrenceburg the Blue Book car tried to go part of the way on the Kentucky side but was warned not to by several people on account of the hostile attitude of the people in that section, which is especially true with regard to strange cars.

Cincinnati to Indianapolis via Lawrenceburg, Greensburg and Shelbyville is a new route. This is an entirely new connection between these important points and road conditions are good all the way.

Indianapolis to Lafayette via Lebanon and Frankfort is a new route. This seems to be much better than the regular route 421 via Kirkland and also a little shorter.

Lafayette to Ft. Wayne is a new route, although going via Delphi, Logansport and Peru. Changes were made between almost all these points as the old routes have been pretty well worn out. The regular route as far as Deer Creek is good. At this point instead of following the Michigan road into Logansport turn east 1 mile and then follow what is known as the Kokomo road. Logansport to Peru, a new route, was covered on the north side of the river. From Peru to Huntington and Ft. Wayne road conditions were reported on previous bulletin.

Logansport to Kokomo is a new route. The car covered two routes but recommended the one via Walton and Galveston to be a little better due to fewer turns. All fine gravel.

Wabash to Marion. New route very good gravel all the way; almost straight south through Mt. Vernon to Mier, then east into Marion.

Huntington to Fort Wayne. New route. This is what might be called a river route on a direct line between these two cities and is good gravel, but is not very much traveled. Although not quite as fine gravel as regular Blue Book route it will make an excellent option and is quite a bit shorter, following the river practically all the way through Mardines and Roanoke.

Fort Wayne to Toledo. The first part to Defiance, over regular Blue Book route is the best, with two long straight stretches, making good time possible. From Defiance to Napoleon the Blue Book car reports the canal road via Florida to be exceptionally fine. Between Napoleon and Toledo the car went over three different routes and finally decided that although the present route is all right for this year, next year a new connection from Liberty Center to White House and then direct on the north side of the river into Toledo will not only be much shorter, but in excellent condition when a 4-mile stretch of sand is gravelled, this being promised before spring.

Fort Wayne to Detroit via Napoleon, Wauseon and Ypsilanti. The first part of this route to Napoleon is reported above. From there to Wauseon and Adrian the present route is the best, although there are slight changes between Ottokee and Lyons. In wet weather there is a 14-mile straight stretch of clay into Adrian that is liable to be pretty bad, although usually good in dry weather. From Adrian to Ypsilanti is fairly good over the present Blue Book route. The rest of the way into Detroit will be practically all concrete when the new work under way is completed.

Ann Arbor to Toledo via Salina and Milan. New route. It is fairly good to Dundee. The scouts found that present Blue Book route to Ida was very bad in wet weather and the car covered a new route which is considerably improved, although there is very little gravel. The rest of the way into Toledo coincides with route 707.

Toledo to Lima and all points south of Findlay. Due to the completion of a new road the route is changed materially to Bowling Green, where instead of following the old route from here south you can keep straight south through Findlay, clear to Kenton, although for Lima you follow the regular Blue Book route from Findlay.

Napoleon and Defiance to Lima via Ottawa. New route. These two routes coming from the north join at Ottawa. Roads all the way are good macadam or gravel.

Lima to Richmond. New route. The first part coincides with present route 610 as far as Piqua, thence southwest through Greenville and New Madison to Richmond. Good gravel with some macadam all the way.

ROAD THROUGH WOODS AT GEARHART, ORE.

Pere to Green Bay, 54.8 miles. Continuing to Sturgeon Bay in the afternoon, a distance of 48.8 miles, through New Franken, Casco, Rio Creek, Forestville and Maplewood.

Running to Ephriam the fourth morning, a distance of 27.3 and back to Sturgeon Bay by lunchtime, the afternoon's drive will be to Manitowoc via Maplewood, Forestville, Algoma, Kewaunee and Two Rivers.

The next day's drive will cover a distance of 97 miles, being through Valders, Chilton, Brothertown, Peebles Station to Fond du Lac by noon, with Oconomowoc the objective point for the night, while the wayside points will be Byron, Lomira, Theresa, Mayville, Iron Mountain and Ashippun.

Leaving Oconomowoc the next morning for a run of 32.5 miles to Milwaukee via Pewaukee, Hartland and Brookfield; in the afternoon returning to Brookfield, thence to Waukesha, Mukwanago, East Troy and Elkhorn to Lake Geneva.

If it is desired to add another day or so to the tour, this may very happily be done by remaining a day at Ephriam, also making Fond du Lac the base for a run to Sheboygan. The Blue Book, volume 4, gives complete running directions for this tour.

SHORT ROUTE IN INDIANA

Fithian, Ill.—Editor Motor Age—Please advise me the best touring route from Fithian, Ill., to Rochester, Ind.—C. H. DeLong.

First running to Danville, the following will be your itinerary: Covington, Attica, Lafayette, Delphi, Logansport, Rochester, and you should have very good roads all the way.

GOOD ROUTE TO FORT DODGE

Covington, O.—Editor Motor Age—Please give me a good route from Covington, O., to Fort Dodge, Ia., as I want to make this trip very soon.—S. B. Bashor.

Motoring to Piqua, where you will strike the main thoroughfare to Lima, proceed via Sidney, Wapakoneta to that city. Your way then will lie to the northwest, touching Delphos, VanWert and Fort Wayne. Heading next for South Bend, as by taking this route in preference to the more direct one to Chicago, you will avoid about a 20-mile stretch of poor road in the river bottoms of the Kankakee, pass through Churubusco, Ligonier, Goshen, and Mishawaka. Of the towns between South Bend and Chicago are mentioned LaPorte, Ainsworth, Merrillville, Scherville, Highlands, Hessville, East Chicago, Chicago.

Leaving Chicago for Dubuque you should pass through Oak Park, Addison, Elgin, Marengo, Garden Prairie, Belvidere, Cherry Valley, Rockford, Freeport, Warren, Shullsburg, Hazel Green, East Dubuque, crossing the river into Dubuque. Then traversing what is known as the Hawkeye higbway, the remainder of your journey will be via Dyersville, Manchester, Independence, Waterloo, Cedar Falls, Austinville, Ackley, Iowa Falls, Webster City to Fort Dodge.

ILLINOIS TO KANSAS

Griggsville, Ill.—Editor Motor Age—I would like a good motor route from Griggsville, Ill., to Moundville, Kas., via Kansas City.—John A. Read, Jr.

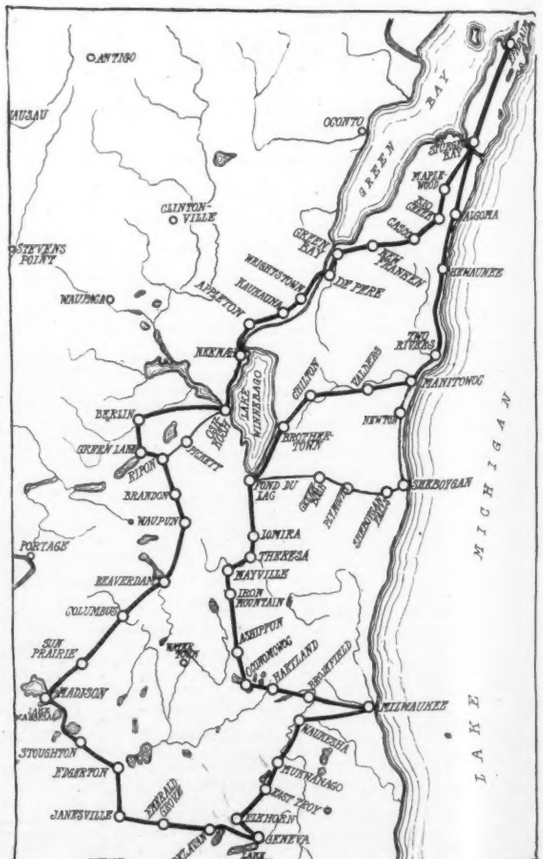
From Griggsville go to Louisiana, thence to Mexico, Mo., through Vera, Bowling Green Curfyville, Vandalia, Laddonia, Mexico, a distance of 60 miles. With Kansas City your objective point, 188 miles, continue west through Thompson Station, Clark, Moberly, Huntsville, Mt. Airy, Roanoke, Armstrong, Glasgow, Gillian, Slater, Marshall, Mt. Leonard, Blackburn, Corder, Higginsville, Mayview, Odessa, Oak Grove, Grain Valley, Blue Springs, Independence, Centropolis, Kansas City. If you do not wish to make this entire distance in one day, you might make Marshall your night stop.

Kansas City to Moundville takes you through Grand View, Belton, Peculiar, Harrisonville, Lone Tree, Archie, Adrian, Butler, Athol, Rich Hill, Arthur, Horton, Wales, Nevada, Nassau, Moundville.

MISSOURI AND ARKANSAS ROUTES

McFall, Mo.—Editor Motor Age—I would appreciate route information from St. Joseph, Mo., to Arkadelphia, Ark.—F. S. Jolly.

The route herewith outlined may seem somewhat roundabout to you, but road conditions are a paramount factor and this has been considered in outlining the route. St. Joseph to Kansas City, 83.4 miles, is through Lake Station, Hall Station, Russville, Mo., Atchison, Lowemont, Leavenworth, Kansas City. Leaving Kansas City with Neosho, Mo. on your first night stop, 185 miles, the intermediate points are: Belton, Harrisonville, Archie, Adrian, Butler, Rich Hill, Horton, Nevada, Sheldon, Lamar, Jasper, Carthage, Fidelity, Neosho. Nevada would make a good noon



TOURING THROUGH WISCONSIN TAKING IN THE SUMMER RESORTS

stop, and good garages will be found on this stretch.

Neosho to Fayetteville, 84 miles, passes through Pineville, Gravette, Bentonville, Rogers. Over this portion a variety of roads will be encountered, but there are no bad grades or streams to cross.

From Fayetteville to Winslow, through West Fork, and Brentwood, you pass over the Boston mountains, then continue through Chester, Lancaster to Van Buren where you cross the Arkansas river to Fort Smith. From Fort Smith to Little Rock is through Charleston, Paris, Dardanelle, cross the Arkansas river to Russelville, thence through Pottsville, Atkins, Morrelton, Plumerville, Wooster, Conway, Palarm, to Little Rock.

Arkadelphia, Ark. is about 97 miles from Little Rock, going by the way of Hot Springs. Through Collegeville, Benton, Londsdale, to Hot Springs you will have considerable mountain work for about 30 miles, but it should not give you trouble. Leaving Hot Springs the balance of the route is through Lawrence, Social Hill, Friendship, to Arkadelphia.

OKLAHOMA TO MISSOURI

McAlester, Okla.—Editor Motor Age—I am figuring on driving from here to Sedalia, Mo., in the near future and would like very much if Motor Age could inform me of a good route to follow. On account of the poor road conditions directly north of here I will ship my car to Muskogee, Okla., and drive north from there.

So far I have been unable to find out anything regarding the proper way to go through Kansas and Missouri. I have considered driving north from Parsons, Kas., following the M. K. and T. Railroad to Kansas City, and then east to Sedalia, but this makes such a roundabout way that I would rather follow the main line of the M. K. and T. from Parsons, through Ft. Scott, Nevada, and Clinton to Sedalia, providing the roads are in such condition as will permit.—O. C. Jacobs.

Leaving Muskogee the towns en route to Joplin, Mo., will be Wagoner, Mazie, Choteau, Pryor, Ada Adair, Big Cabin, Vinta, Afton, Narcissa, Miami, Baxter Springs and Galena. From Joplin your best route will be north to Kansas City, via Carthage, Jasper, Lama, Sheldon, Nevada, Rich Hill, Adrian, Archie, Lonetree, Harrisonville, Belton and Grandview; thence east via Independence, Blue Springs, Oak Grove, Odessa, Higginsville, Blackburn, Mt. Leonard, Marshall, Arrow Rock, Lamine to Boonville, following from this point the M. K. and T. railroad to Sedalia.

Another way from Joplin would be to go east to Springfield passing through Diamondville, Pierce City, Monette, Aurora, Marionville and Republic. We understand it is possible to get through to Sedalia by going north from Springfield, but that it is very rough traveling, and we are unable to give any of the wayside points. There is also a chance of your going as you suggest from Nevada to Rockville, Clinton and Windsor, following the line of the M. K. and T. railroad; or, by continuing north to Harrisonville, you would be sure of a good road that far and from there might follow the railroad through Holden, Warrensburg and Lamonte to Sedalia, but the only route Motor Age can recommend is that by way of Kansas City.

INDIANAPOLIS TO NIAGARA

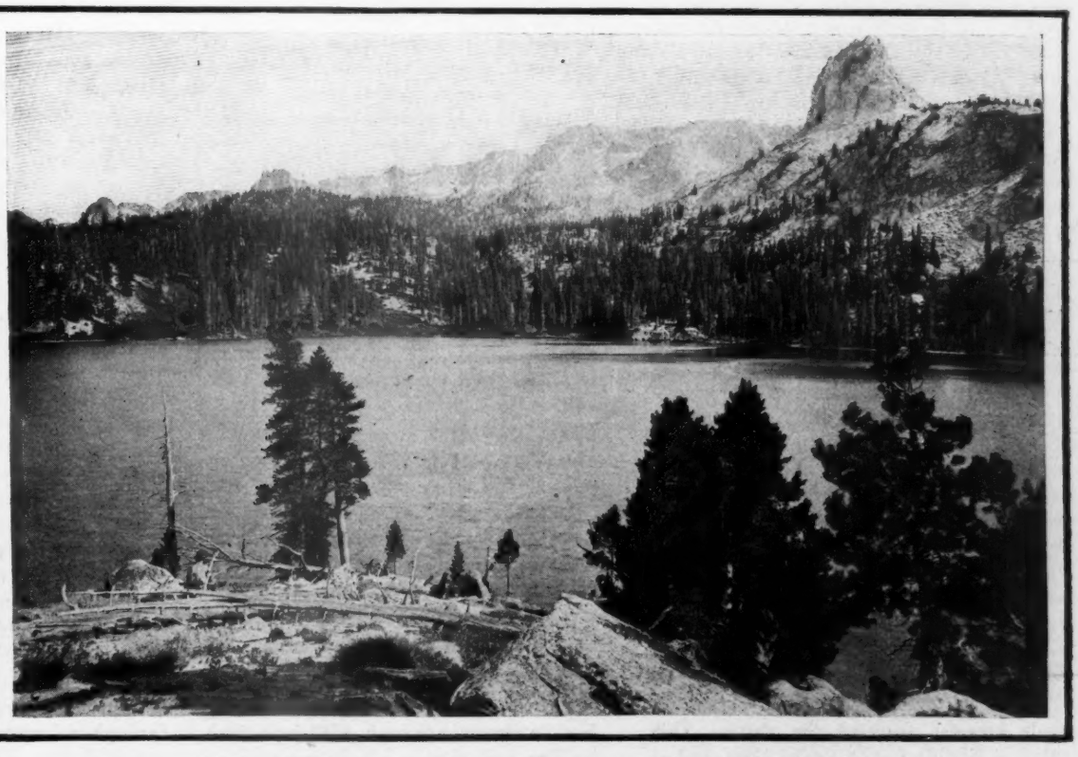
Concord, Ill.—Editor Motor Age—I would like to drive my car through to Niagara Falls by the way of Indianapolis, Dayton and Detroit. Will Motor Age please give the best route, and state where would be the most attractions and the best roads? What would be the distance, and how much of the trip would be over hard roads? Also what map or book I could get for this route.—Howard Zahn.

Either run to Prairie or down to Jacksonville, where you will strike a main traveled route leading to Springfield. With Terre Haute the next objective point, 149.5 miles, you will have good natural dirt road with some gravel going via Decatur, Lovington, Oakland, and Paris. From here to Columbus, O., you will travel on the National road. Indianapolis, 70.4 miles, is reached by way of Plainfield. After leaving the Hoosier capital you will pass through Knightstown and Richmond to Dayton, a distance of 108.6 miles; thence via Springfield to Columbus, 67.8 miles, on good pike over level country. Leaving now the National road and branching north toward Toledo, 132.7 miles, the road is good gravel or stone all the way; among the wayside points will be Little Sandusky, Carey, Fostoria, Pemberville. Your best route to Detroit from Toledo will be via Riga, Tecumseh, Saline, Ypsilanti and Wayne, the distance being 92.9, with fair dirt and macadam roads. The run north to Port Huron will be found a delightful one over good gravel practically all the way, a distance of 60.6 miles, via Mount Clemens and Muttonville.

A 7-day permit is allowed in Canada where the party is well-known to the collector of customs; otherwise, an Ontario license must be secured which costs $4, and a bond good for 6 months, costing $5, must be obtained from a customhouse broker; in addition a deposit of $10 is demanded by the broker, but it is returned when the bond is cancelled.

Ferrying from Port Huron to Sarnia, continue through Kertch, Warwick, Adelaide, Lobo, Hyde Park, London, Thamesford, Ingersoll, Woodstock, Oxford, Brantford, Hamilton, Grimsby, Jordan, St. Catherines, St. David to Niagara Falls, Ont., and turning with trolley line across the International toll bridge to Niagara Falls, N. Y.

A Blue Book, volume 4, is recommended.



LAKE GEORGE, CAL., IN THE SIERRAS ON THE PASEAR ROUTE

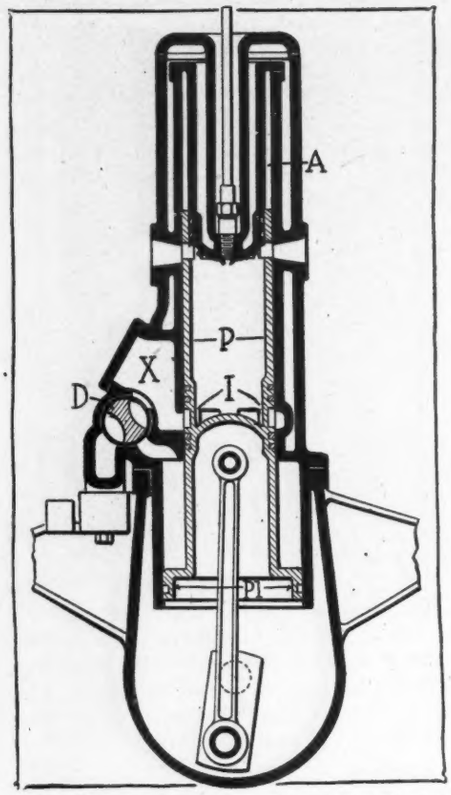


FIG. 1—FEATURES OF KOECKLIN MOTOR

The Readers

High-Efficiency French Motor is Two-Cycle and Uses New Sleeve Valve—Stearns-Knight Measurements—Supplementary Discussion of Power Comparisons

CLEVELAND, O.—Editor Motor Age—Please tell me about a two-cycle sleeve-valve motor built in France, and known as the Koecklin motor, invented and built by G. H. Koecklin. I have designed a two-cycle sleeve-valve motor which does not use a carbureter, absolutely scavenges the cylinder every revolution, fuel is not admitted until cylinder is scavenged, and uses only about two-fifths cylinder full of charge. It is high compression and constant for all speeds and loads. Fuel is fed into cylinder by air from the crankcase. The sleeve performs all the functions of admitting air from the crankcase to the fuel tank, crankcase to cylinder, fuel from tank to cylinder, and release of burned gases. I have been told that the French motor does all that I do with mine.—Robert T. Abell.

The Koecklin motor is the invention of Alfred G. Koecklin, and is of the two-cycle type. It is generally referred to as of the sleeve-valve type, but strictly speaking, the valve is not of the sleeve type, but is merely a tubular extension of the piston. This motor is identified with the high-efficiency group that is being developed in France, one having been built for the grand prix. Fig. 1 shows a cross section of this motor in which P is the piston, which is of the double superimposed type, the lower portion P1 being of a larger bore, and running in the bored-out portion of the cylinder which forms the gas pump chamber.

Above the cylinder head the piston extends upward, forming the valve. This valve is similar to the sleeve type, and is cut with exhaust ports at the cylinder head, and inlet ports at I, and reciprocates in the annular chamber, A. The spark plug is set deep into the hollow cylinder head, as in Knight practice, except that the seat is greatly deeper. At D is a rotary distributor which conducts the gas from the carbureter to the compression pump before compression, and from thence to the adjacent cylinder after compression through the passage X.

As will be seen by a study of the drawing, this motor reverses the usual order, in that the combustion chamber is inclosed by the piston itself, the cylinder head being disposed within the reciprocating combustion chamber. In operation, the valves are opened at the end of the down stroke, the piston extension ports registering with the exhaust valves and the inlet valves, the compressed gas from the chamber X, being admitted to the cylinder, driving out the burned gases.

DIMENSIONS OF STEARNS-KNIGHT

Corpus Christi, Tex.—Editor Motor Age—Please let me know the dimensions of parts of the Stearns-Knight motors:

1—Width of intake and exhaust ports in outer and inner sleeves.

2—Height of center of intake and exhaust ports, respectively, above center of wrist pin on each sleeve.

3—Length of valve operating connecting rods, between centers.

4—Angle between eccentric cranks.

5—Thickness of sleeves.

6—Width of junk ring.—W. E. C.

1—Ports in sleeves are in the form of two slots, placed in the same plane. They are of the same size in both sleeves. The inlet slots measure .5-inch by 2.75 inches, the exhaust ports, .625-inch by 2.75 inches, each. The total port width of each valve therefore, is 5.50 inches.

2—On the outer sleeve, the center of the exhaust port is 7.75 inches from the center of the wrist pin, the intake, 8.25. On the inner sleeve, these dimensions are, for the exhaust, 9.375 inches, and for the intake, 10 inches.

3—The valve-operating connecting rods are respectively, between centers, 2.50 inches, inner, and 4.25 inches, outer.

4—The half-time cranks are set at an angle of 75 degrees to each other.

5—The sleeves are each .1562-inch thick.

6—The junk ring is 1.25 inches wide.

Criticisms By Readers

New York Man Gives Additional Reasons for Car's Power Limitations When in Mud-Hole

NEW YORK—Editor Motor Age—May I take the liberty of supplementing the answers to two correspondents in issue of August 1? One of them asks why four horses can pull a motor-car out of the mud better than its own 30-horsepower motor. The explanation of Motor Age that this is because the horse applies his force more effectively is correct, but it is not clearly stated why the motor fails to apply its force effectively. The real reason in brief is that until the car actually begins to move, the motor cannot exert any effective pull at the rear wheels, except through the friction of the slipping clutch or the slipping wheel, which dissipates most of the energy in heat until the clutch or wheel takes hold; or through the distortion of the shafting.

Power is energy in the act of overcoming resistance. Until the object acted on begins to move, the energy is simply a potential force, like gravity, water head, gaseous pressure, etc. The contraction of the horse's muscles is analogous to an elastic but frictionless transmission, and the forward throwing of his weight on the traces is like the steady pressure of a boiler, which is absent in an explosion motor. The latter's best asset in a mud-hole is the inertia of its rotating parts.

A second correspondent asks why the small-bore French motors develop high power, and the answer is "increased stroke, high compression, and excessive speed." These factors should be separately considered. It is not true that long stroke per se gives increased expansion in a gas motor, for if the compression remains the same, obviously the ratio of compression space to piston displacement, which determines the degree of expansion, remains the same regardless of the relation of bore to stroke. It is true that for equal compression, equal bore and equal speed of rotation, the long-stroke motor gives more power than the short-stroke, but that is simply because we then have the same explosion force acting on a longer lever or crank-arm through a longer distance, in the same time.—Robert M. Pierson.

Clearing House

Modified S. A. E. Formula Compared with Actual Brake Test of Oldsmobile Motor—Correspondent Confuses Piston Speed and Crankshaft Speed

New Horsepower Rating

Reader Believes Constant in Modified S. A. E. Formula Too Great for the Average Motor

KEMPTON, Ill.—Editor Motor Age—I read the columns of Motor Age pretty closely, and was considerably interested in the new horsepower rating contained in the July 25 issue under Mathematics of Motoring. Although I lay no claim to being a mechanical engineer, it seems to me that the constant 15,000 in the formula

$$\frac{D^2 N S R}{15{,}000}$$

is too high. The constant 12,000 in place of the 15,000, according to a formula I saw in Motor Age quite awhile ago, seems to me to be more nearly correct. This new rating does not rate a long-stroke motor any higher than the old standard S. A. E. rating at 1,000 revolutions. Take for example the 4 by 6 Moline motors. The S. A. E. rating is 25.6; new rating is almost identical at 1,000 revolutions per minute. The 5 by 6 Olds motor figures at 40 horsepower by both ratings always assuming 1,000 revolutions per minute. The 4¼ by 5 motor of the car which I drive figures at the new rating at 24 horsepower. The same motor figures at 28.9 S. A. E., thus showing an actual loss over the S. A. E. of over 4 horsepower and this too in a motor in which the stroke moderately exceeds the bore. The claim is made that the standard S. A. E. rating is approximately correct at 1,000 revolutions; then, the new rating cannot be right, as at 1,000 revolutions in the example in August 1 issue it shows the 4½ by 5 motors to have 27 horsepower. The S. A. E. shows 32.4. Now, to take the constant 12,000, take a 5 by 5 as the Speedwell motor, using 12,000 in this formula, shows 41⅔ horsepower, practically agreeing with the S. A. E. on a square motor. Now, again take the 4 by 6 Moline, S. A. E. rating 25.6 with the 12,000 constant, 32 showing an increase of power for the increased stroke. Taking everything into consideration, I fail to see where the new rating is of any use.—Clarence B. Keighin.

Undoubtedly, some motors will develop in actual brake tests greater power at their maximum speeds than shown by the 6-in stroke will figure at 1,000 revolutions per minute, the horsepower as shown new formula, but there are as many others that will develop less. The difference in results obtained by using the two constants, 12,000 and 15,000, is 20 per cent, and differences in design of individual motors of the same dimensions and at the same speed will cause almost this much variation in brake horsepower. The endeavor in developing the new formula was to simply rearrange the standard S. A. E. rating formula so that it would take cognizance of variations in stroke and crankshaft speed.

Your assumption of 1,000 revolutions per minute for motor car engines is unwarranted as nearly all of them run at a normal speed of at least one-third more. A fairer figure, if you must assume a standard speed for all motors would be 1,400 revolutions per minute. The idea of the new formula, however, is to take differences of crankshaft speed into consideration as well as stroke.

You are correct in your figures for the Moline and Olds motors, assuming they develop their maximum power at 1,000 revolutions per minute, for any motor with by the standard S. A. E. rating, as explained in the Mathematics of Motoring department of Motor Age for August 1. But the Moline motor develops its greatest power at 1,400 revolutions per minute. At this speed, the motor is rated by the new formula at 36 horsepower, which is very close to the actual power shown on brake test at this speed.

The normal speed of the Oldsmobile four-cylinder 5 by 6-inch motor is 1,550 revolutions per minute, not 1,000 revolutions per minute as you have figured it and at its normal speed develops on the brake 58 horsepower approximately. If you figure it according to the new formula, you will find that it is rated at a little over 61 horsepower at 1,550 revolutions per minute. In Fig. 2 is shown a chart illustrating a brake test of the Oldsmobile 4 by 6-inch motor on which is plotted the power calculated at the corresponding speeds by the new formula. The formula, using the constant 12,000 instead of 15,000, would rate these motors much too high. In the case of the 5 by 6-inch motor at 1,550, the figure would be about 73 horsepower.

Brake horsepower of different makes of engines of the same size and running at the same speed vary greatly. Some engines, on account of finer design and workmanship, will show considerably greater power at a given speed than will others of the same bore and stroke even when designed to give their maximum power at the same speed. And very few will be found to give the maximum power at the same crankshaft speed.

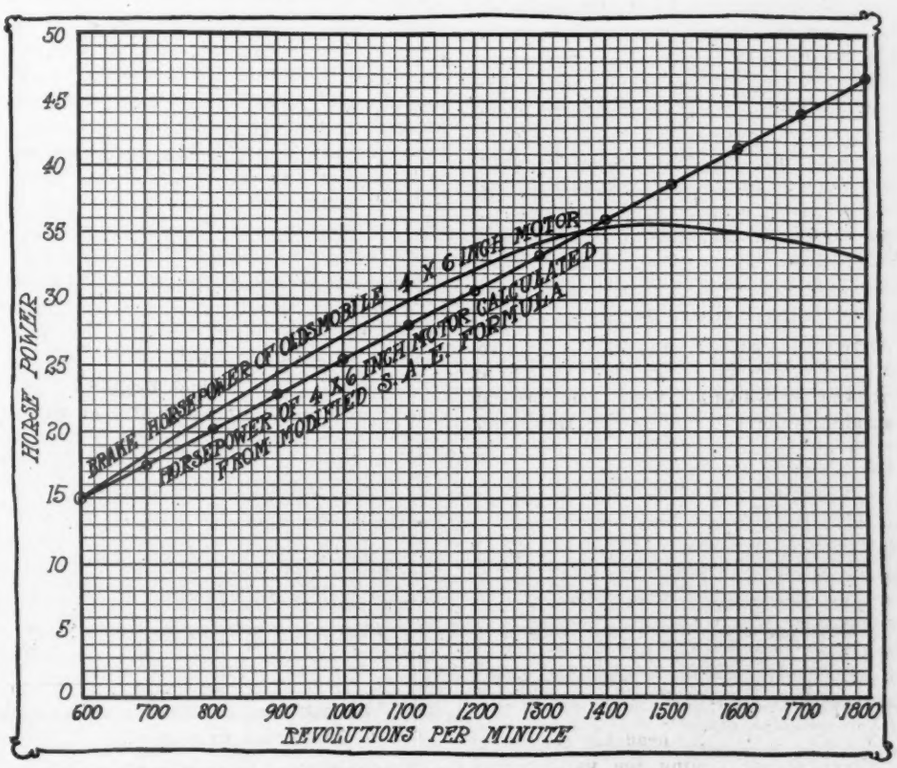


FIG. 2—COMPARISON OF ACTUAL BRAKE TEST OF OLDSMOBILE MOTOR WITH RESULTS CALCULATED FROM MODIFIED S. A. E. FORMULA

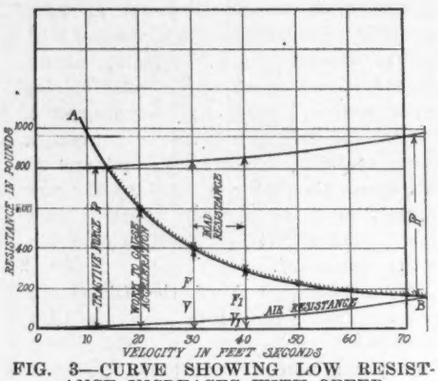


FIG. 3—CURVE SHOWING LOW RESISTANCE INCREASES WITH SPEED

Below are given the horsepowers for a few representative motors as calculated by the new formula at speeds given by the makers as those of maximum power:

Car	No. Cyl.	Bore	Stroke	Max. R.P.M.	S.A.E. H.P.	Modified S.A.E. H.P.
Abbott 30.....	4	4⅛	4¼	1,800	27.3	35
Abbott 44.....	4	4½	5½	1,650	32.4	49
Alco 40.....	4	5¼	5½	1,500	44.1	60
Alco 60.....	6	4¾	5½	1,500	54.1	72
Cole 30.....	4	4½	5¼	1,600	32.4	45.5
Ford T.....	4	3¾	4	1,400	22.5	21
Hupmobile 20...	4	3¼	3⅜	1,800	16.9	17

PICRIC ACID FOR POWER

Minneapolis, Minn.—Editor Motor Age—I would like information regarding the use of picric acid in motors to increase the power, and would like to know the quantity to use with safety.—J. C. Burns.

1—Picric acid, or ammonia nitrate, is an explosive compound which, when used in connection with gasoline as a fuel for motor cars will increase the power of the combustion within the cylinder. To understand this, it is first necessary to consider the requisites for the combustion of a fuel in an internal combustion engine. The gas used to produce this combustion is composed of the fuel contained in the gasoline vapor, which is rendered combustible by its admixture with the oxygen in the air, which composes the body of the gas. Picric acid possesses in its composition a considerable proportion of this element in addition to highly explosive fuel units, and when introduced into the charge of a gas engine, causes the power of the explosion to be augmented by the increase of the amount of oxygen. It furthermore possesses the peculiarity of being soluble in gasoline to only a limited degree, and for this reason is usually diluted with alcohol or ether before mixing with the gasoline.

Best results are obtained by the use of 1 ounce of picric acid and 2 ounces of sal ammoniac to 5 ounces of gasoline. It is well to observe extreme caution in using anything of its kind, for gasoline motors are designed within comparatively narrow limits of strength, and can be expected to resist very little more than the pressure normally exerted by the combustion of pure gasoline gas.

There is danger in handling this substance, and it is not recommended for use in motors.

Another Reader on Gear Changes

York State Motorist Urges High Top Speeds—Says Manufacturers Should Consult Owners in Fixing Ratios

PAUL SMITHS, N. Y.—Editor Motor Age—Designers are at a disadvantage in discussing motor cars on the road. This is a broad statement to make, but how many of them ever drive any but their own make of cars? My recreation is owning cars, knowing cars, and driving other people's cars when they will let met. I am not a chauffeur and am as strong an adherent of four speeds as can be found, but I contend that nine out of ten American four-speed cars have the wrong ratio and, undoubtedly, many foreign cars also.

I always was surprised that the National engineers did not put four speeds in its cars. Admittedly, they like the same effect in their stock racing cars, for their advertisements usually say—stock model except for the use of a higher second-speed gear; translated, that comes pretty close to meaning a high third, as should be in a properly proportioned four-speed box. Having driven in one of the stock racers at 65 miles an hour on second, I can appreciate that it is a good deal higher than in the touring models. In its case the car is comparatively light and has a most powerful and flexible motor, which makes up, to a certain extent, for the lack of four speeds; especially so, since the touring models are quite high geared on second, but this same high second sometimes requires you to go up a hill rather faster than comfort dictates. I should prefer a National with four speeds—high about where it is, third a bit higher than the touring second, and second quite a bit lower than it is at present. I am not trying to give exact ratios because I neither have the ratios at hand nor do I discuss from the theoretical standpoint. I am the user, not the manufacturer. I would infinitely rather have a National with its correctly proportioned three-speed gear box than many four-speed cars with incorrectly proportioned thirds.

Compare the National and Pierce transmission ratio in Motor Age July 25. The National second and Pierce third are almost the same. The Pierce third will climb almost any hill that second will and I contend that when driving a Pierce a man would not keep on direct fourth when climbing a hill as long as possible—see Ferguson's article—if he had a high enough third so that his engine would not race when he dropped back.

I think, from road experience mostly, that the American designer usually makes his third too slow in a four-speed gear-set; when third will give you within 10 to 15 miles the speed of high, you have an ideal combination because you can boost your high up a little and save the motion and yet have a nice cruising speed on third. For American conditions, I do not like an excessively high gear, for as Mr. Wall states, your chauffeur must earn every penny, shifting gears. Theoretically, for average conditions, I used to favor four speeds direct on third and even built a car that way, but, unless the car is to see very sandy and hilly conditions, I do not like it because with our constantly improving roads, one is necessarily in indirect altogether too much.

Because I have referred to one car as about right on high, I do not want it inferred that I consider most American cars are right on high; I think most of them are much too low; even, at 30 miles an hour, many of them create a most unpleasant vibration and show plainly that the motor is developing more power than is necessary for level roads. I repeat that I prefer three speeds in proper ratios to four that are not, but four speeds in propor ratio is the most nearly ideal that I have ever used.—Subscriber.

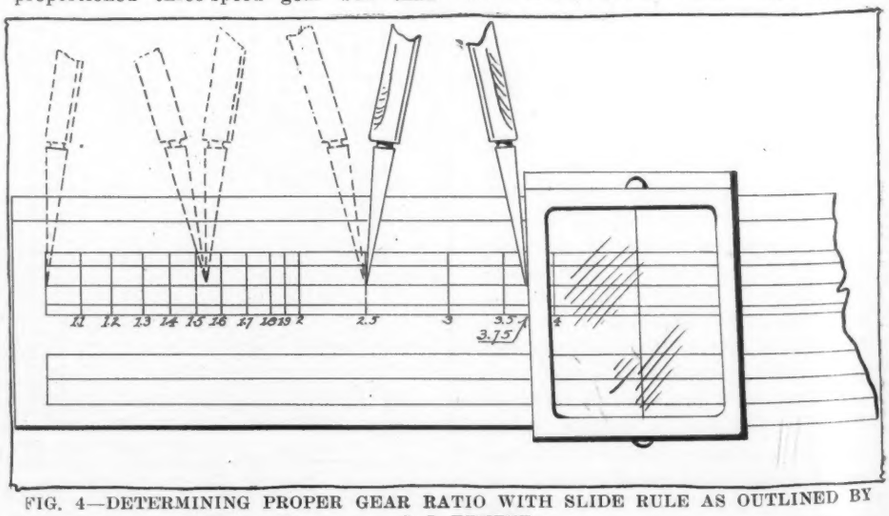


FIG. 4—DETERMINING PROPER GEAR RATIO WITH SLIDE RULE AS OUTLINED BY S. I. FEKETE

Four-Speed Fan Criticizes Cameron

Detroit Engineer Explains Method of Determining Steps of Progression—Advocates Geometrical Method

DETROIT, Mich.—Editor Motor Age—Very recently several of our leading trade papers published a very remarkable article, by W. H. Cameron, on the subject of four-speed transmissions. In this he predicts its general adoption and its necessity. This article certainly came at the right time and on the right subject. I believe that at the present time the minds of several engineers are occupied with the problem of four-speed transmissions.

I wish to introduce a very simple mechanical way of locating correct gear ratios for any number of speeds. At the same time I wish to call attention to Mr. Cameron's paper, to his reasoning and explanations, but would not advise following his diagrams illustrating the steps between the gears, for the reason below stated. In the diagram where ordinate O. X. is apparently the time, while the gears are engaged and ordinate O. Y. stands for the velocity in miles per hour, if we were to make a diagram like that which he illustrates before laying out a set of gears, and in this diagram the steps between velocities were to be equal, then the result would be in some cases an error, because such a diagram gives us the arithmetical progress instead of that which we need, the geometrical progression.

In my opinion, the gears in a transmission should progress in a geometrical progression because the resistance increases in the velocity interval in a hyperbolic curve. During acceleration—getting away—the road resistance increases and is a function of the velocity. If we suppose there is one even condition of the road bed, going at top speed, the road resistance consumes the power output of the motor. If we analyze the increase of the resistance, we find that it is in geometrical progression.

When a car starts, a certain amount of work is required to cause acceleration, and the other part of this work is required to overcome the resistance of the car. The total tractive effort given by the motor is consumed by these two factors. When the resistance is so high as to consume all the tractive effort, then there is no more work left to cause acceleration, and so the car begins to travel with a constant velocity, or in the equation,

Resistance=tractive force.

During acceleration the work is consumed by two factors, one which causes acceleration and the other is the resistance. That is

Force to cause acceleration+resistance=tractive effort.

If we imagine a constant horsepower output during acceleration, then

$$\text{H. P.}=\text{constant}=(\text{force to cause acceleration}) \times \frac{V}{550}$$

Or

$$\text{H. P.}=\text{constant}=\text{mass} \times \frac{dv}{dt} \times \frac{V}{550}$$

And this is an equation of a parabola.

Let F mean the force to cause acceleration in one interval in Fig 3, and V the velocity, and let F_1 equal the force to cause acceleration in one other interval and V_1 the velocity, then

$$F \times V = \text{constant}$$
$$F_1 \times V_1 = \text{constant}$$

This equation of a hyperbola referred to its asymptotes will represent the increase of resistance.

To prove that this curve in Fig 3 is geometrical progression, it is necessary to plot it over on logarithmic paper. On this paper it should appear as a linear function. In Fig 5, the ordinates are the values of the velocity and the scale used is a logarithmic scale of the slide rule. The ordinate signifies the resistance in pounds on the same scale. On this diagram, if we take equal steps between gears taken, between any chosen points, then they will give us a geometrical progression.

If we take a pair of dividers and make steps on the scale, as in Fig. 4, such reading will give us geometrical progression. To get any number of gear ratios between a chosen lowest ratio and to the direct drive, all that is necessary is to divide the slide rule into as many equal spaces as we want intermediate speeds. If we begin dividing at the point which is our lowest gear and take the readings where the dividing points come, we will get the correct theoretical gear ratios. This division may be subject to change during process of designing, on account of inability to secure even center distances and pitch.—S. I. Fekete.

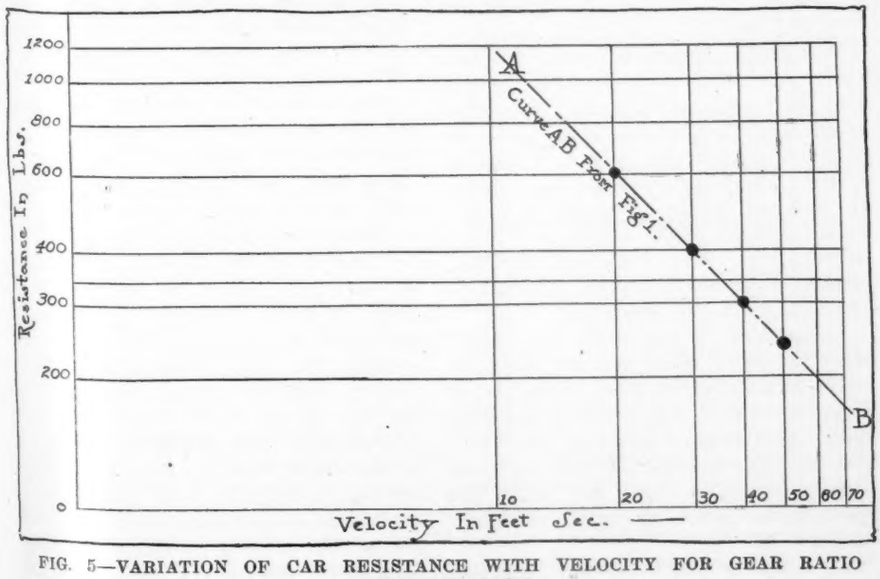


FIG. 5—VARIATION OF CAR RESISTANCE WITH VELOCITY FOR GEAR RATIO DETERMINATION

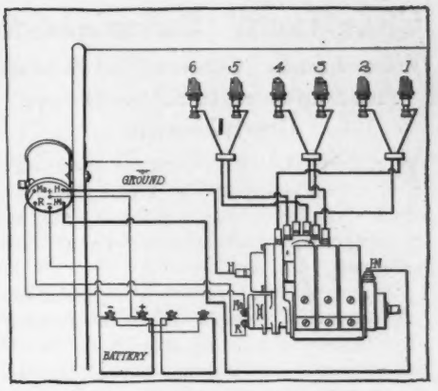


FIG. 6—WIRING OF 1910 WINTON

WINTON WIRING

Bedford, Ohio—Editor Motor Age—I am very much interested in knowing how the 1910 Winton with the Eiseman magneto and storage battery is wired, and will appreciate this information in a future issue of Motor Age.—J. F. Taylor.

The Winton wiring diagram appears in Fig. 6.

COST OF REMODELLING KISSEL

Louisville, Ky.—Editor Motor Age—I have a model D9 Kisselkar. What changes would be necessary to make a two-passenger speedster out of it, and also the approximate cost?—A Reader.

To remodel a D9 touring car, the old body will have to be replaced with the new one, and the angle of the steering column adapted to the lower driving position of a runabout body. A good roadster body for this car may be built for about $175, or a regular Kisselkar body bought for $200 f. o. b. the factory. The total cost of such a change will probably amount to $250. Detailed instructions may be obtained of the Kissel Motor Car Co., Hartford, Wis., or the Chicago branch.

'Chauffeurs' Examination

What London Commercial Drivers Are Expected to Know Before Given License

AGRICOLA, KANS.—Editor Motor Age—This clipping is from the New York Sun, I think to reprint it with replies to each question would be of deep interest.

"There must be rather a higher grade of commercial vehicle driver in London than in New York, to judge by an examination paper for a prize offered by the Commercial Motor Users' Association not long ago. The prizes amounted to $50, $35 and $25 respectively, and there were sixty competitors for the money. Here is what was asked of the men who drove gasoline vehicles:

"1—Give a brief description of the vehicle you drive.

"2—Describe how you would time your engine if you had to reassemble it, there being no marks to guide you. At what parts of the stroke do the inlet and exhaust valves open and close? State in each case whether the piston is going up or down in the cylinder, and at what point does the ignition occur?

"3—Explain exactly the cause of an engine popping back into the carbureter, and what you would do to stop it.

"4—If the float of your carbureter developes a leak, how would you detect it, and what effect would it be likely to have on the engine? Give a sketch and describe some form of carbureter with which you are acquainted, and state what you know of its means of adjustment. How may gasoline be saved, firstly, by method of driving, and secondly, by adjustment of carbureter?

"5—Explain the various causes of knocking in an engine, and give the causes of big end failures.

"6—State, as far as you know, all the causes of engine overheating.

"7—What parts of your machine are likely to need replacing after the following mileages have been covered: 10,000, 20,000 and 30,000?

"8—A van runs 300 miles a week and consumes the following stores: 1 gallon of gasoline, at 25 cents a gallon, for each 7½ miles; 1 gallon of oil, at 50 cents a gallon, for each 250 miles; tires cost $375 a set, and run 12,000 miles; other expenses including wages, $16.92 a week. What is the cost of the vehicle per mile?

"9.—Sketch and describe a differential gear. What is the object of fitting such a gear, and would anything serious happen if it seized while traveling along a straight line?

"10.—What is the difference between a high-tension and a low-tension magneto? Give a detailed diagrammatical sketch of any type. Why do you only need one wire to connect up a low-tension magneto to a multi-cylinder engine?:

"11—Some makes of vehicles are fitted with one set of brakes on the back wheels, and the other on one of the gear shafts, while others have both sets acting directly upon the road wheels. Which type do you prefer, and give your reasons?

"12—What do you consider is the best form of final drive to the road wheels for vehicles of the following load capacities: 30 cwt., 3 tons and 5 tons? Give your reasons."—F. L. Williams.

1 and 2—The first and second questions are pertinent to a particular car, but as a general rule, in regard to the second question, the exhaust valve should open from 35 to 40 degrees before dead center on the down stroke of the piston. It should close on dead center on the up stroke. The inlet should open practically simultaneously with the closing of the exhaust, and remain open until the crank is from 20 to 50 degrees past bottom dead center. Ignition takes place on dead center, or a shade past it when retarded, at the top of the compression stroke.

3—The usual cause of popping back into the carbureter is leaky inlet valves. This may be the result of poorly seated valves, or of a weak spring. To remedy

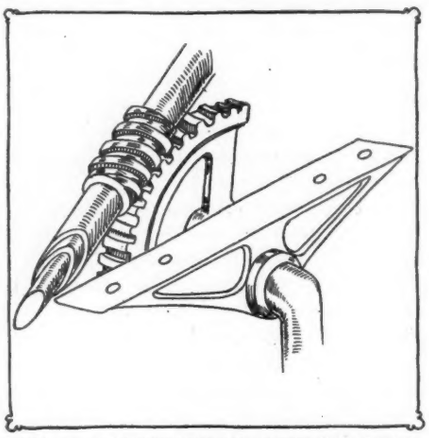


FIG. 7—IRREVERSIBLE STEERING GEAR

this trouble, either the valves should be ground, or a new spring be fitted, as the case may be.

4—A leaky carbureter float of the metallic type would betray itself by permitting the carbureter to flood, resulting in overflow of the gasoline from it, and an over-rich mixture for any but starting speeds. The result would be bad missing or stoppage of the motor and an evil smelling exhaust. The adjustment of carbureters has been described in these columns numerous times, and reference to such description is requested.

5—Knocking is caused by loose bearings; too early spark for the speed of motor, as under severe load; broken piston rings; overheated motor, causing pre-ignition; motor loose on frame or loose connection; a loose commutator will sometimes cause knocking, as will a bad carbon deposit, uneven compression and poor lubrication.

Big ends, or crank bearings, are deranged either by lack of sufficient lubrication, improper alignment or overloading the engine.

6—Overheating is caused by lack of water, obstructions in the water line, pump failure, stoppage of fan, running continuously on too low a gear, racing the motor, running on a retarded spark and an open throttle, overloading, carbon, deposit in cooling passages or radiator, poor mixture, imperfect valve timing, hot bearings due to disalignment and imperfect lubrication.

7.—Interpreting this question as in reference to parts surviving for that amount of travel, the parts most likely to require replacement after 10,000 miles of running are: Clutch facing, parts of wiring, fan belt, brake shoes, contact points on timer or contact-breaker of magneto, such parts as spark plugs and equipment accessories being of uncertain life, although they probably would need replacement in this time. After 20,000 miles the valve springs probably would have lost their elasticity to some extent, and the valves are likely to have been worn down to a point where replacement would be advisable; some types of steering gears would require new wearing surfaces, another facing would have been worn off the clutch, new brake shoes would be needed, rewiring would be advisable, a new belt would be required on the fan, the magneto would need minor replacements, new crank bearings might be needed and new crank shaft journals. The piston rings might by this time need to be replaced, and various gaskets, etc., would have outlived their usefulness. After 30,000 miles all of this would be required again, in all likelihood, and in addition, the cylinders would greatly profit by regrinding, and consequent renewal of the pistons. The camshafts would in some cases have to be replaced, as 30,000 miles of running would have worn them until they no longer opened the valves properly; new wrist pin bearings would be needed, the water pump probably would be near its limit of usefulness and the ignition and lubrication systems would require more or less complete rehabilitation.

8—This is simple arithmetic and needs no editorial comment, the answer is 6½d per mile, or 13 cents per mile.

9—Bevel gear and spur-gear differentials have frequently been illustrated in these columns. This device is for the purpose of transmitting the torque of the drive shaft to the live rear axle or counter shaft, so as to permit the wheels to revolve at different speeds, or to permit them to run in opposite directions, without affecting the speed of the drive shaft, and always maintaining an average between the differential speeds of the wheels, equal to their speed if revolving at the same rate. The practical application of this result is to permit the car to turn corners, without causing any drag on the wheels, and transmitting the driving power to both wheels regardless

of differential speeds. If it seized while traveling along a straight road, in such a way as to drive both wheels positively at the same speed, no change in the direction or speed of the car would result, in fact, it would be temporarily advantageous. If, however, the course deviates from a straight line, in any particular, the wheels would drag and at any speed, cause serious skidding and undue tire wear.

10—A high-tension magneto is a magneto that unaided by external appliances, produces a high-tension or high-voltage current. A low-tension magneto is a magneto that produces a low-tension current, which must be raised to a high voltage by means of induction, outside of the apparatus. A low-tension magneto sometimes is connected to a multi-cylinder with but one outlet wire by using a single, non-vibrating coil, and a distributor.

11—On a chain-driven truck, both brakes should be placed on the rear-wheel drums, because, in case a chain breaks or climbs its sprocket, the counter-shaft brakes would become useless, and there seldom is time to reach the emergency lever in time to avert catastrophe, if in an emergency the running brake fails. On a shaft or worm-drive truck, a service brake on the drive-shaft is safe if properly designed, and by the action of the differential is applied to the wheel that offers the most tractive resistance, which is an advantage over equalized brakes on the wheels. However, such brakes are a strain on the differential. The best system seems to be to apply all four brakes on the wheel drums, equalizing them with cross-trees.

12—In regard to final drive systems, there is not sufficient positive data obtainable to warrant Motor Age in answering this, as all opinions are as yet more or less personal on this subject.

BAD MIXTURE DECEIVES

Toledo, Ill.—Editor Motor Age—I have a Reo 4-cylinder 30 horsepower car. My motor runs nicely on the batteries, but when I am running slowly on the magneto, and go to speed up, it runs on three cylinders, and continues to do so until I let my motor race for a few minutes. It runs nicely when all four cylinders work.

2—Would oiling my cylinders through the gasoline supply be a success on my car, and if so, what proportions should I use?

1—Since your magneto will perform properly when the motor is warm and has just been raced, it is evident that it is not at fault. The trouble is probably with your carbureter adjustment. You are able to get good firing from your batteries under all conditions, because your battery current is stronger than the magneto; and the mixture is near enough right so that it does not manifest its error until you attempt to accelerate with the relatively weak magneto spark, with your motor running slowly. The reason why your motor picks up on all four cylinders after racing it is because the racing process blows out the excess of gasoline, and the magneto spark at high speeds is strong enough to run on the rich mixture. Carefully thin your mixture, giving especial attention to medium speeds. Also accelerate gradually, as too rapid acceleration on any motor will cause irregularities.

2—The Reo motor may be satisfactorily lubricated through the fuel supply; in the proportions of one part of oil to five parts of gasoline. In making this change, the carbureter will require slight adjustment, to allow for the slight dilution of the gasoline, and its difference in gravity, when mixed with oil. This method, however, is of value only as a means of lubricating the valves and walls of the cylinders. Other forms of oiling must be employed to lubricate the crankshaft and connecting rod bearings.

NOISE IN CLUTCH

Washington, D. C.—Editor Motor Age—I am the owner of a 1912 Cadillac touring car and ever since I have had it have been annoyed by a chuckling or knocking noise which occurs under the car when the clutch is thrown out, as in coasting down hill, etc. I cannot locate the trouble nor can various mechanicians who have examined it, but as this same trouble has been noticed by other owners of this model, I hope you will be able to suggest the remedy.—Subscriber.

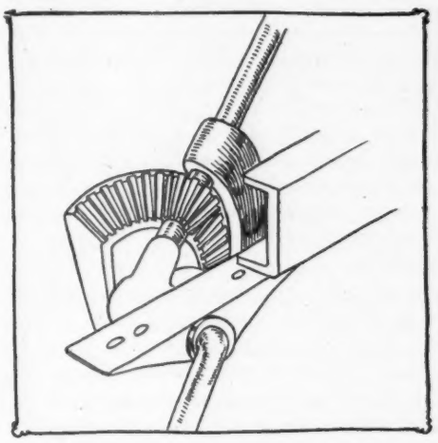


FIG. 8—NON-IRREVERSIBLE GEAR

The sound to which you refer is the result of play in the transmission parts, and does no harm. It is quite common in used cars and there is no remedy for it.

STEERING TYPES ILLUSTRATED

Plano, Ill.—Editor Motor Age—Please illustrate the most common types of steering gears of the two classes described in the issue of August 15.—Reader.

Of the non-irreversible types regarded with the most favor, the bevel-gear type, as in Fig. 8, is perhaps the most popular. Of the best accredited irreversible types, the worm and sector form, as in Fig. 7, is generally conceded as standard. Many variations in structural details, however, are to be found. These illustrations are merely for the purpose of showing operating principles.

Dynamo Will Not Excite

Hoosier is Puzzled by Behavior of Small Direct-Current Generator

ALBION, Ind.—Editor Motor Age—I have a small direct-current generator, bipolar and shunt-wound with a drum armature, the commutator has 12 segments, the insulation on the wiring is good, the coils are alright, as they have been tested several times. The fields lose their magnetism and will not stay magnetized. The superintendent at the power house connected the fields in the exciter circuit for a couple of hours, the machine worked finely for a day or two and then refused to generate. It has been magnetized several times since, but will not last very long. It will refuse to generate after the armature stops and is started again. It will generate a hot spark when short circuited for an instant after it is newly magnetized.

The machine will work well by connecting the fields to a single dry cell, a very weak one will magnetize them in good shape. It is used for ignition work on a portable engine, the armature turning about 1,800 revolutions per minute. There is no name, nor any marks on the machine. It was formerly used on an Angola gasoline engine. It is an enclosed type.—Chas. M. Marquiss.

The trouble with this particular generator is probably due to the fact that the resistance of the shunt field circuit has been increased due to imperfect or dirty contacts between the connection of the field coils. It is hardly probable that the field magnet would lose all of its residual magnetism. It is more likely that the resistance of the shunt field circuit has been increased to such an extent that the small electromotive force which is generated by the residual magnetism is not sufficient to overcome the increased resistance in these fields. The connections between all of the field coils should be thoroughly cleaned and soldered. The field coils themselves should be tested for grounds by placing one terminal of a 110-volt circuit on the magnet and the other through a voltmeter and to contact with the field wire to determine whether there is any reading on the voltmeter. This will test for a ground from the field coil to the frame, which would offer a bypath for the exciting current of the coils and would prevent the machine from building up its voltage. The trouble is with your exciting circuit, which accounts for its good behavior when a dry cell is used for this purpose. Clean up your field coil contacts, and you should have no more trouble.

If however, it is found that after a thorough cleansing of the contacts the machine is still sluggish, they must be affected by obscure grounds or be worn or scored to such extent to be worthless, in which case replacement is the only remedy.

The Mathematics of Motoring

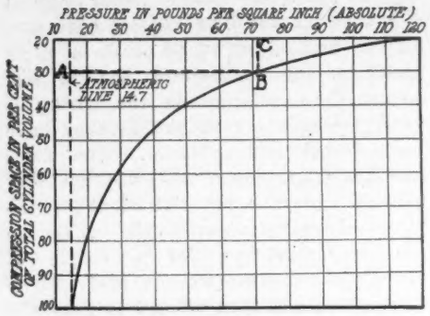

PRESSURE IN POUNDS PER SQUARE INCH (ABSOLUTE)
10 20 30 40 50 60 70 80 90 100 110 120
COMPRESSION SPACE IN PER CENT OF TOTAL CYLINDER VOLUME
20 30 40 50 60 70 80 90 100
A
B
C
ATMOSPHERIC LINE 14.7

FIG. 1—CURVE GIVING COMPRESSION PRESSURE

CALCULATION of the compression of the gas in the cylinders of an engine has to do more with the designer than with the motorist, except for the purposes of comparison of a given motor with an ideal one. The compression pressure of any motor in actual use can be readily obtained by means of any of the pressure gauges marketed for the purpose, and which are designed to be screwed into the cylinder in place of the spark plug or pet cock. If, then, the theoretical compression for a motor of the same dimensions be calculated, a means of comparison is afforded which will show in a way the state of the motor under test; for the compression pressure in a cylinder is to some extent a criterion of its condition.

Compression in the cylinder of a motor is primarily based on the fact that the atmospheric pressure of every square inch of surface exposed is 14.7 pounds, so when a cylinder is filled with mixture on the suction stroke the pressure within that cylinder is 14.7 pounds to the square inch. Before stating definitely how compression is calculated, it must be remembered that pressure of a gas, or, in other words, its compression, is inversely proportional to the volume of the gas. For example: If we had a cylinder 10 inches long filled with gas at atmospheric pressure and compressed it into a cylinder 5 inches long and of the same diameter, the pressure of the gas would be twice as great, that is, 29.4 pounds to the square inch. If the gas in a 10-inch cylinder were compressed into one 3½ inches long, or one-third of the size, the pressure would be three times as great, or three times 14.7 pounds. In the same way, if the gas in this cylinder were compressed into a space one-quarter the size, the pressure would be four times as great; or if into a space one-fifth the size, the pressure would be five times as great. This, however, is only on the assumption that the temperature remains the same throughout. But the temperature in the cylinder does not remain the same throughout the compression stroke and for any thing like accurate results must be taken into consideration.

Calculating Compression

From this the compression, neglecting temperature changes, may be computed fairly accurately as follows:

$$\text{Compression} = \frac{Vs + Vc}{Vc} \times 14.7$$

Vs = piston displacement in cubic inches.

Vc = combustion chamber displacement in cubic inches.

In this equation when the piston displacement is known for the cylinder and the desired compression is known by solving the equation, the combustion chamber volume in cubic inches can be obtained. Regarding changes in pressure, when the temperature is increased, for every 1 degree centigrade rise in temperature there is an increase in pressure of 1/273 pound.

To obtain the exact pressure that is developed by the compression of the gases in a cylinder is a rather difficult proceeding without the use of logarithms, for it has been demonstrated that the variation of the pressure with the volume in a gas engine very nearly follows the law

$$p\,v^{1.3} = P\,V^{1.3}$$

where p is the pressure at the beginning, that is, atmospheric pressure or 14.7 pounds per square inch absolute; v is the volume filled by the gas with the piston at the lowest point of its stroke; P is the maximum compression pressure; and V is the compression space in the cylinder with the piston at the highest point of its stroke.

That is, the compression pressure P in pounds per square inch is found by solving the equation,

$$P = p\left(\frac{v}{V}\right)^{1.3}$$

It simply means to divide the total volume of the cylinder by the compression space, raise the quotient to the 1.3 power and multiply by 14.7. The use of the exponent 1.3 requires the employment of logarithms.

In order to do away with the necessity of logarithms the curve, Fig. 1, has been plotted, from which the compression pressure can be read directly if only the percentage of the total volume occupied by the compression space be known. This is simply the cylinder volume less the piston displacement, and in commercial motors usually runs from 25 to 30 per cent of the piston displacement. The use of the chart can be explained best by an example.

Assume it is desired to find the proper compression in a cylinder of 5 inches bore and 6 inches stroke. The piston displacement is found by squaring the bore, multiplying by the stroke and then multiplying by .7854.

5x5x6x.7854=117.81 cubic inches.

The exact area of the compression space cannot be readily measured, on account of the irregular shape of the inlet and exhaust ports, but a sufficiently close approximation can be obtained by finding the area of the cylinder above the piston and adding 50 per cent for the passages. Suppose this was found to be 45 cubic inches in this motor. Then the total volume of the cylinder is 117.81 plus 45 equals 162.8 cubic inches.

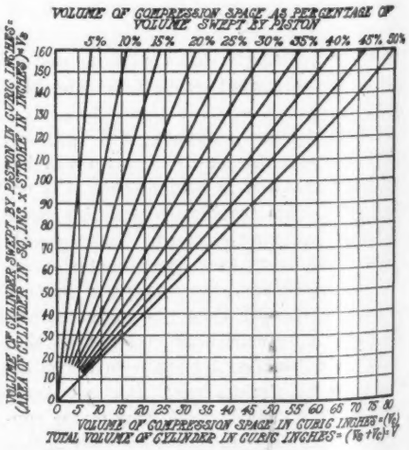
Then the per cent that the compressor space is of the total cylinder volume is

$$\frac{35}{162.8} \text{ equals } .295$$

or approximately 30 per cent.

So then, we enter the curve, Fig. 1, at the point marked A on the left, which corresponds with a compression space which is 30 per cent of the total volume of the cylinder, and go right on the horizontal line to the point marked B where the curve cuts the 30 per cent line, then vertically upward to the point marked C reading 71 pounds per square inch as the theoretical compression of the motor. This 71 pounds per square inch is absolute pressure and to reduce it to gauge pressure, subtract 14.7, giving 56.3 pounds per square inch.

Fig. 2 is a chart showing compression space as a per cent of the volume swept by the piston for different cylinder volumes and compression spaces. This was compiled by James Gunn and will assist in figuring the compression space percentage. From this, if the volume of the compression space, Vc, is known and the volume swept by the piston, Vs, the percentage can be read off directly.


VOLUME OF COMPRESSION SPACE AS PERCENTAGE OF VOLUME SWEPT BY PISTON
5% 10% 15% 20% 25% 30% 35% 40% 45% 50%
VOLUME OF CYLINDER SWEPT BY PISTON IN CUBIC INCHES = (AREA OF CYLINDER IN SQ. INS. x STROKE IN INCHES) x ½
160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
VOLUME OF COMPRESSION SPACE IN CUBIC INCHES = (½) TOTAL VOLUME OF CYLINDER IN CUBIC INCHES = (½ + ½c) V

RELATION OF COMPRESSION SPACE TO CYLINDER VOLUME

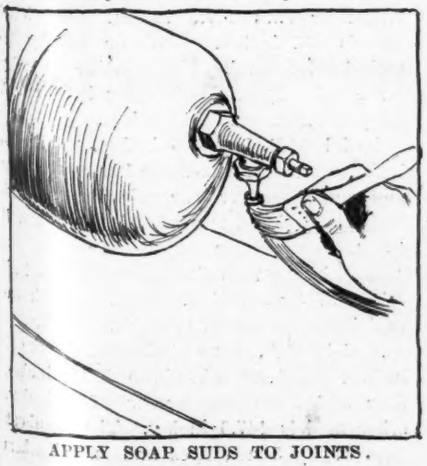
The Motor Car Repair Shop

Testing Lighting Piping

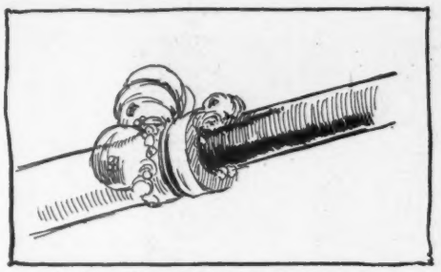
A LARGE proportion of users of gas tanks for acetylene lighting seems to be carelessly throwing away a considerable portion of the money expended on the light supply, through the use of leaky pipe lines. The result of a series of tests along this line has led the Prest-O-Lite company to establish a service station in each of the cities where the company now has a branch office. These stations are equipped to give free service to gas tank users in locating leaks and showing them how to deliver the full capacity of each tank to the lamps. However, not every owner has access to one of these service stations. For this class of users of gas lighting tanks the following directions for testing pipe lines will be valuable in preventing loss from leakage.

Leaking pipe lines are a frequent but needless source of waste. The trouble lies almost always in the carelessness of the user. Complaints of short measure and excessive gas consumption are always traceable to leaks. The peculiar feature of this is that if the owner will spend but a few moments in testing the tubing from the tank to the lamp, the waste will be eliminated, and in many cases the life of each tank of gas will be doubled.

First disconnect the rubber tubing at the lamps and pinch or clamp the ends tightly. Go over every inch of the rubber and brass tubing and each connection with heavy soap suds, seeing that every portion is thoroughly covered with it. Then turn on the gas. A leak at any place will be shown at once by the formation of a bubble. If it is formed at a connection, this should be tightened at once. If the bubble appears on any portion of the tubing (either rubber or brass) it is a sign that the tubing should be replaced or repaired. Rubber is a very treacherous substance and hardens and cracks very easily after exposure to air, heat and sunshine—yet some gas tank users are clinging to rubber tubing that they have used for 1 year or more.



APPLY SOAP SUDS TO JOINTS.



BUBBLES SHOW LEAKS IN LINE

The places where the rubber is joined to the brass tubing should be watched carefully, as they are a prolific source of leaks. Wherever the tubing is run through the frame or mud apron, it should be protected from wear. Very often leaks are found at such spots. The rubber tubing, however, is the worst offender and a few cents spent in putting in new rubber connections will often pay for itself many times over in gas saved. When all of the tubing and joints have been tested and connections to the lamps, the lamps themselves should be tried for leaks. Put soap suds around the base of the tip and on the stem which holds the tip and on the rubber tube joint at the lamps. Then turn on the gas and light the lamps. If bubbles appear at the joint in the stem inside the lamp, this stem should be unscrewed and the threads covered with white lead.

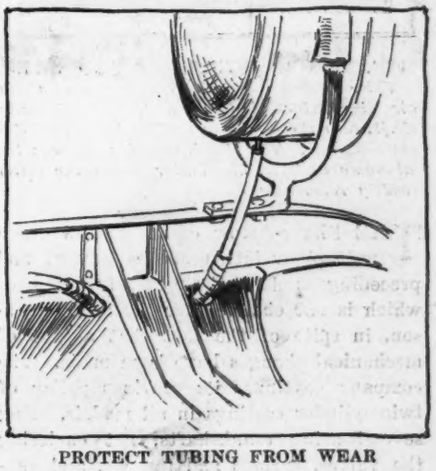
Every owner should make this simple test, whether he suspects a loss of gas from leaks or not—and it should be done three or four times a year, at least. Every gas tank is charged to full capacity and fully tested at our charging plants, and wherever a user seems to be emptying his tanks too rapidly, in nearly every case pipe-line leaks will be found responsible.

Replacing Pressure in Fuel Tank

When the supply tank of a motor car using pressure feed to the carbureter is refilled with gasoline, most motorists use the hand pump provided to replace sufficient pressure in the tank to get the motor started. Generally there is enough gasoline in the carbureter at all times to run the motor for several minutes, in which time sufficient pressure could be raised in the tank through the pressure feed from the exhaust in the regular way so that it rarely should be necessary to resort to the hand pump. On some cars employing pressure feed the hand pump is so rarely used that the washers in it dry up, and when it does become necessary to use it, it will not work. In such cases, the desired results often can be obtained by temporarily plugging the outlet of the exhaust pipe and then cranking the motor. This will create excessive pressure in the exhaust pipe which will be conducted through the regular pressure piping to the fuel supply tank. Thus a few turns of the crank will be just as effective as the pump when the latter is in good order.

Makeshift Tire Shoe

One of the most harassing kill-joys of the motorist who is driving in the country is the fear that one of his tires will blow out while he is without a blowout patch or other suitable means for making a satisfactory repair. The motorist of experience never will take chances of being stalled on the roadside or having to ride on the rim for lack of proper tire repair equipment, but as we are all inclined to be negligent at times, the recent experience of a local motorist may be of interest. A blowout occurred out in the country many miles from a source of supplies. An inside blowout patch would have made possible a very effective repair, but there was nothing of the sort in the car, and the driver decided to wait for a passing motorist, in hopes of borrowing this necessary article. Being an ingenious person, he did not wait long before a plausible idea shaped itself in his mind, and, leaving instructions for the rest of the party to hail the next car that might happen along, he went to the next farmhouse and managed to secure an old boot. From this a suitable blowout patch was cut, placed inside the casing over the hole, and, being of generous dimensions, enabled the party to be under way in a very short time. The hole in the casing was quite large, and an outside patch also was made from the same boot, to prevent the entrance of stones and dirt. The repair proved very successful, and put an end to what might have proved a long wait. In this case, ingenuity took the place of proper care.



PROTECT TUBING FROM WEAR

Pierce-Arrow Cars for 1913 Season

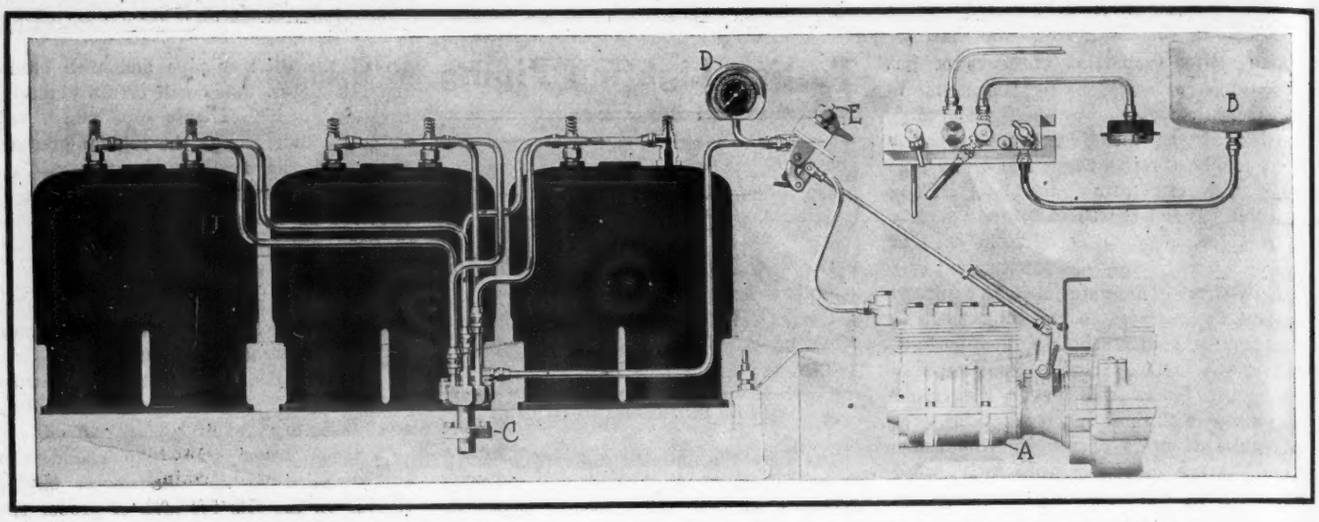


FIG. 1—DIAGRAMMATIC ILLUSTRATION OF PIERCE-ARROW COMPRESSED-AIR SELF-STARTING SYSTEM

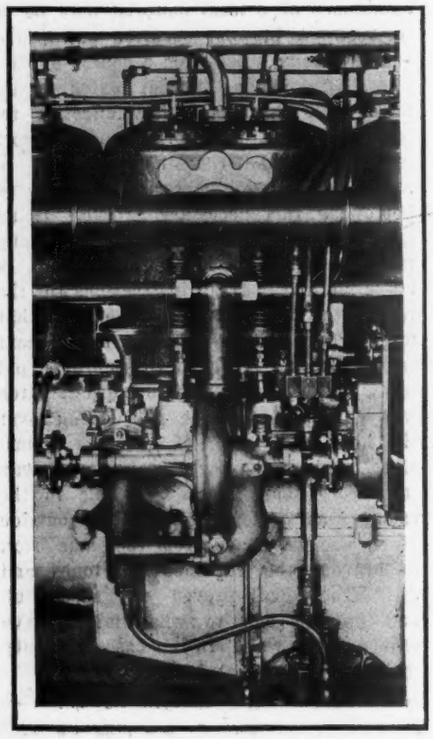


FIG. 2—AIR DISTRIBUTOR AND PIPES

This photographic reproduction shows the air distributor on the top of the oil pump shaft, also the air pipes leading to each of the six cylinders. The clutch coupling between the oil pump and the distributor makes the latter readily removable.

Host of Mechanical Changes but General Design Retained—Compressed Air Self-Starter Feature

THE Pierce-Arrow cars for 1913 are a natural evolution of the present and preceding models, the general design of which is not changed for the coming season, in spite of the fact that a host of mechanical changes have been made. The company continues its previous policy of twin-cylinder castings in all models, using seven-bearing crankshafts, not enclosing the valves, springs and tappets, and continues the use of a cone flywheel clutch, four-speed gearset, and other characteristics. Those familiar with the Pierce-Arrow this year will have little difficulty in recognizing the 1913 line, although body alterations have been made.

Changes Enumerated

While retaining the former general layout, the many mechanical changes made show a year of activity in the designing and drafting departments. Instead of the large oblong-shaped gravity copper oil tank above the cylinders, there is used a direct pressure system, the gear oil pump delivering direct to all of the crankshaft and connecting rod bearings. This change simplifies the general appearance of the motor. Compressed air self-starters are used, there being a four-cylinder air pump on the gearbox to maintain a pressure of 200 pounds in the air reservoir for the starter. This air pump is also used for tire inflation. . In addition in this self-starting means the company retains its present gasoline primer which consists of a plunger gasoline pump on the dash connected with the gasoline line and also with a spray jet in the intake manifold, so that one stroke of the pump injects sufficient gasoline into the manifold to facilitate starting. The compression release system is now fitted on all models and aids in facilitating starting.

There are numerous other changes which can only be enumerated here, but referred to in detail later: The cone clutch is fitted with a leather facing with cork inserts instead of the German bronze of this year. There is a double universal joint between the clutch and gearbox; the gearbox is 4.5 inches further to the rear, allowing of dismounting the clutch without disturbing the gearbox, and also making room for the air pump; the propeller shaft is a tube instead of a solid bar; the rear axles have been generally improved by making the drive shafts removable without dismantling the axle housing, and open bodies are of sheet aluminum instead of cast aluminum, the cast product being used in the closed types only.

The nomenclature of the three models for next year differs somewhat from that of this year. This year they are 36, 48 and 66, but for next year, 38-C, 48-B and 66-A. In addition, there is 48-D, which is a continuation of the present model 48 with the addition of an acetylene self-starter and an electric lighting outfit, together with other 1913 equipment.

Particulars of 1913 Models

The particulars of the three models are: 38-C, bore 4 inches, stroke 5.5 inches, runabout wheelbase 119 inches, four and five-passenger cars 127.5 inches, and closed models 132 inches. Tires are 36 by 4.5 inches all around. The gasoline capacity is: runabout 22.5 gallons, and four and five-passenger cars 24 gallons.

Model 48-B, bore 4.5 inches, stroke 5.5 inches, runabout wheelbase 128 inches, four and five-passenger car wheelbases 134.5 inches and closed types 142 inches, as well as seven-passenger cars. The runabout uses 36 by 4.5 inch tires all around and all others 37 by 5 inches. Gasoline tank capacities range from 22.5 gallons to 25.5.

Model 66-A, bore 5 inches, stroke 7 inches, runabout wheelbase 133.5 inches, four and five-passenger cars 140 inches, other models 147.5 inches. The runabout uses 37 by 5-inch tires and on all others

the sizes are 37 by 5 inches in front and 38 by 5.5 inches in rear.

Compared with this year, 38-C is the only one to use larger cylinders, being raised from 4 by 5⅛ to 4 by 5.5 inches, this calling for larger diameter valves, heavier crankshaft and other parts and consequently a higher horsepower rating. The cylinder sizes in the other two models have not been altered.

Motor Alterations

There are several minor motor changes, although the general symmetry of layout is unaltered. On the right side are the carbureter and magneto, the latter opposite the front cylinder casting. On the opposite side are four units, electric generator, oil, pump, self-starter, distributor and water pump. Leather disk couplings are used in the magneto and pump shafts in place of metal couplings. The disks are of ¼-inch stock and 4 inches in diameter for the magneto and 3 inches for the water pump. The fan bracket is made with a screw adjustment to tighten or loosen the fan belt, as needed. There are screw caps over the valves in places of cover plates and screws. Crankshafts are of greater diameter, connecting rod cap bolts are larger in diameter and many other similar minor changes have been made, showing the general care with which the entire motor has been gone over.

Fig. 1 diagrammatically illustrates the compressed air self-starter, showing the air pump A on the forward end of the gearbox, the air reservoir B, which is located horizontally above the muffler on the left side of the chassis, the air distributor C on the motor, which delivers the pressure to the cylinder in the firing position, and also the pressure gauge G on the dash, and the control valve E for bringing the air pump into operation whenever needed, it being understood that there is a jaw-clutch mechanism between the air pump and the forward end of the countershaft in the gearbox, by which the pump can be operated when desired through a control lever on the footboard. The air from this pump is delivered into the tank where it is started at a pressure of 200 pounds. From this tank it is led to the air distributor, Fig. 2, located on the left side of the motor between the water pump and lighting dynamo and driven by a continuation of the vertical oil-pump shaft. From the air distributing housing piping leads to special connections in the cylinder heads, each of these containing a check valve. The control of the apparatus is from the floor board, where there is also located a gauge to show the air pressure in the tank. The air distributor is a rotating disk having a crescent-shaped slot. The air supply enters the cover of the distributor centrally and the air delivery pipes enter the distributor case beneath the disk. As the disk rotates its slot registers in firing order with the different cylinders delivering the air pressure to the one in correct position and to the other in sequence, so as to give a continuous turning movement to the crankshaft.

New Pierce Air Pump

A new design and position of the air pump is shown in Fig. 4 on the forward end of the gearboxes, and Fig. 3 is a vertical end or side section of it. The pump is a Pierce product and is a 4-cylinder air-cooled design. The cylinders, 1 7/16-inch bore and 1¼-inch stroke, are formed in one casting. The crankshaft is ⅝-inch bar on which are mounted the four eccentrics which take the connecting rods. The pistons carry one eccentric ring with diagonal split at the upper end and have large rectangular perforations midway of their height. In each cylinder head is an automatic discharge valve forming a connection between the pump cylinders and the collector tube in the casting head. There is a fifth automatic valve in the delivery tube to the tank reservoir, this valve being located immediately above the valve for the front cylinder. The pump operates on the two-cycle principle, there being drilled in the cylinder walls a series of small holes at a point immediately above the piston head at the lowest point in its stroke, these holes appearing in the second cylinder. The pump has an overall length of 10 inches and a height of 8 inches. For tire inflation work it is recommended to take the air direct from the pump instead of from the 200-pound reservoir on the chassis over the muffler. This is owing to the possible danger of bursting tires by using the reservoir pressure.

Fig. 5 diagrammatically illustrates the

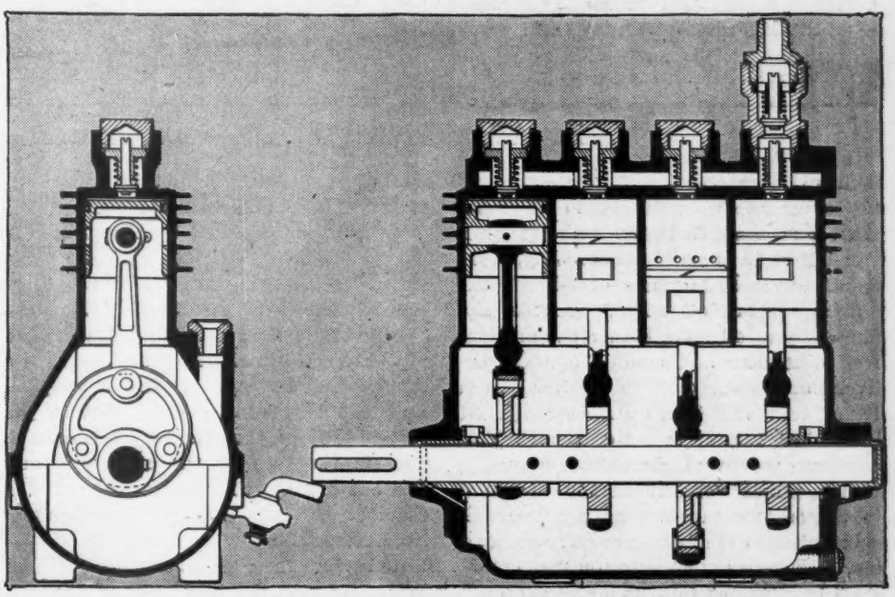


FIG. 3—VERTICAL SIDE AND END SECTION OF AIR PUMP

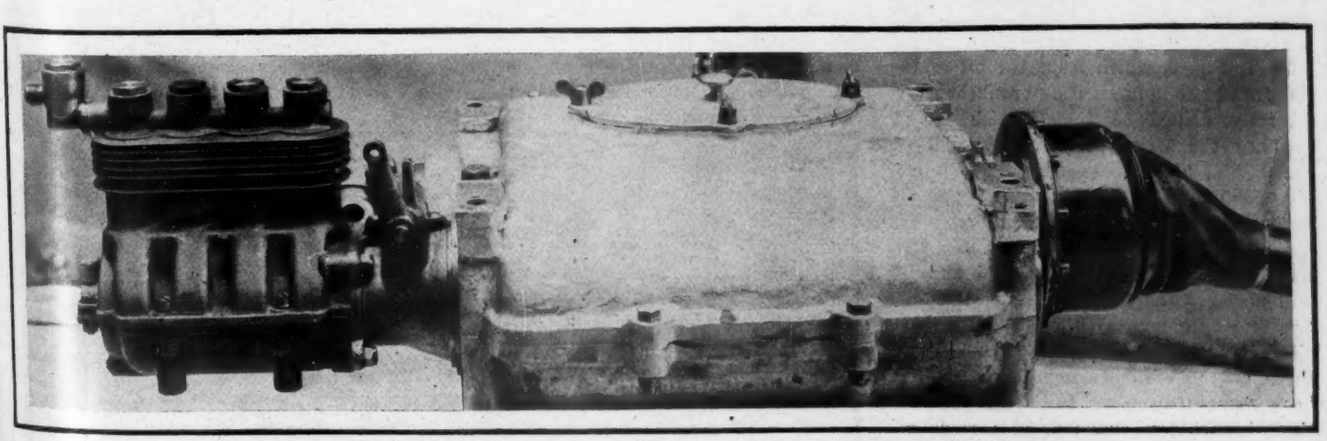


FIG. 4—GEARBOX WITH FOUR-CYLINDER AIR-PUMP ATTACHED TO FORWARD END AND CLUTCH DRIVEN FROM THE SHAFT

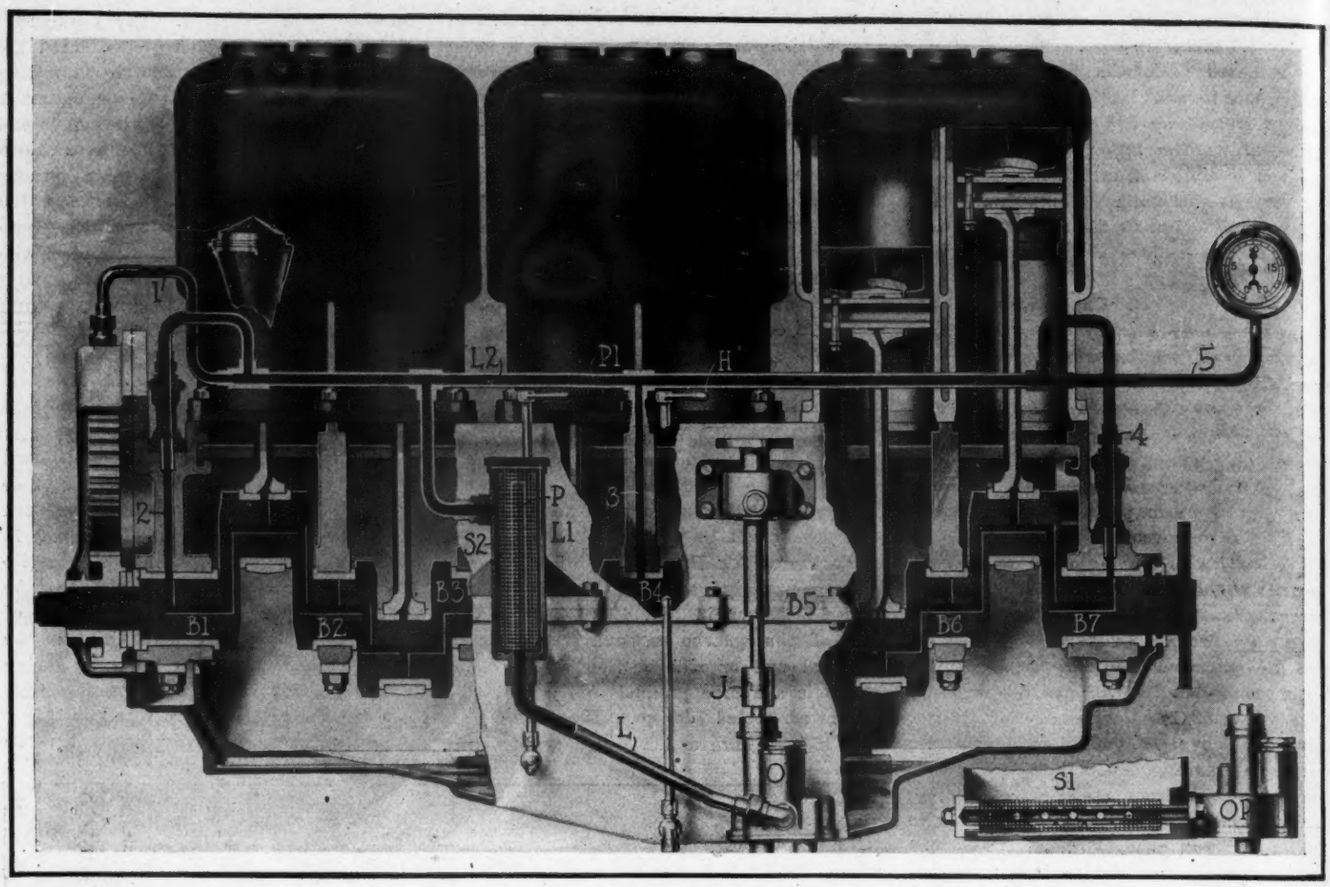


FIG. 5—IMPROVED PRESSURE OILING SYSTEM ON 1913 PIERCE-ARROW CARS

improved pressure feed oiling system of the motor which delivers oil to all crankshaft and connecting rod bearings at a pressure of 20 pounds. As formerly, there is not any splash system created by the ordinary means of connecting rods dipping into an oil level, rather the pressure feed does it all. The oil pump OP delivers through a duct to a filter screen P and from this to a distributor pipe PI lying along the top of the crankcase. This distributor delivers through a branch 1 to the timing gear, through a branch 2 to the front crankshaft bearing, through a branch 3 to the middle crankshaft bearing, through a branch 4 to the rear crankshaft bearing, and through a continuation 5 to the pressure gauge on the dash. The pressure is 20 pounds to all parts. Each connecting rod is fitted with a small copper tube T, Fig. 6, which leads the oil to the hollow wrist pin. The crankshaft is liberally drilled so that branch No. 2 supplies the wrist pins for cylinders 1 and 2 and also the bearing B2. Branch No. 3 supplies oil to bearings B3 and B4 as well as to the connecting rods for the middle cylinders. Branch No. 4 supplies for crankshaft bearings B6 and B7 and also for the connecting rods for the two rear cylinders. While there are three oil feeds, namely, branches 2, 3 and 4, to three of the crankshaft bearings, it has been demonstrated in tests that one of these branches is sufficient to furnish oil for all of the crankshaft bearings and the six connecting rod bearings, this being due to the continuous oilway from end to end of the crankshaft and the pressure of 20 pounds generated by the pump. A double precaution has been taken in the matter of screening the oil between successive circuits of the motor. There are two strainers S1 surrounding the suction pipe through which the pump draws its supply and S2 in the discharge pipe. Both can be readily cleaned, that on the suction side of the pump by removing a plug in the face of the crankcase, and the one S2 by the hinged cap of the chamber L1 in which it is located.

No Excess Oiling

Heretofore the Pierce company has used baffle plates in the open ends of the cylinders to prevent an excess of oil being splashed, but for 1913 these baffles will not be used, the reason being that with a new pressure oiling system delivering oil up the connecting rods there will not be that amount of oil thrown off the crankpins, and so an excess will not reach the cylinders. The provisions of this year for oiling the forward bearings of the camshaft and magneto shaft are continued, and consist in branches from the pump lead 1 being carried to these respective shafts. Two commendable improvements in the field of accessibility is carrying the shaft for the drain cock up to the top of the crankcase at H1 and also that for the oil level test cock up to the point H2, making it possible to open each of these without having to reach down among the motor parts. The oil pump is entirely external and is readily removable by means of the jaw coupling J. Its shaft is continued upward, carrying on its upper end the air distributor for the self-starting system.

The new carbureter is a double-jet one. The two nozzles, N and N1, Fig 7, are

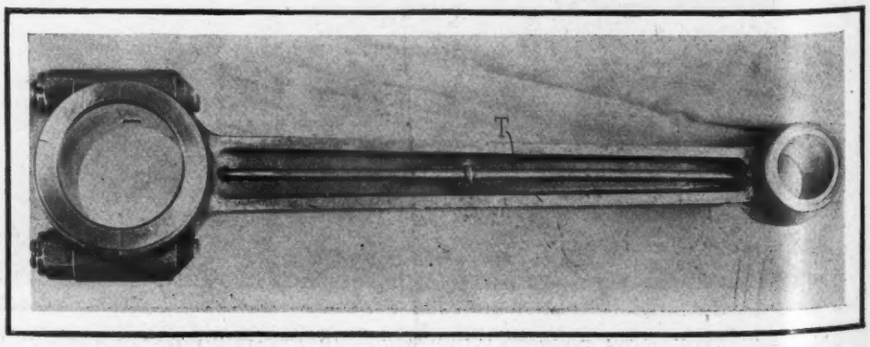


FIG. 6—THE OIL IS LED UP A TUBE TO THE TOP OF THE CONNECTING ROD

located respectively in the center of the concentric float and in the auxiliary air passage. Both are controlled by hand-adjusted needle valves and are so positioned that the auxiliary nozzle does not come into use until a speed of 800 revolutions per minute is obtained and the auxiliary air valve has opened. Using the two nozzles gives a better carbureter performance on low-speed work and also on high-speed work than was obtainable with the single jet type used to date. Thus there is a high general average on low, medium and high speeds due to the double jet combination. An admirable improvement has been made in the needle valve NV in the main nozzle. This valve has a 19-degree taper on its upper end and to protect this taper there is an enlarged fluted portion F serving as a guide to insure the point of the needle centering in the opening of the nozzle. There is a second protection for the coned tip by way of a shoulder H on the valve. The valve is of double threaded diameter, the portion above the shoulder of small diameter, that beneath the shoulder of larger diameter, and the shoulders so positioned that when the valve is set tight on the shoulder the tip of the cone is in its proper closest adjustment. This protection removes the possibility of destroying the cone tip by screwing it up against the opening in the nozzle.

Auxiliary Air Intake

The auxiliary nozzle is a similar cone tip hand-adjusted needle valve. The operation of this nozzle is closely connected with the auxiliary air valve which has not been changed. The valve consists of two sets of reeds or vertical leaf-shaped springs. The outer set R1 is the weaker, and opens partially. For further opening the reeds bear against the inner set R, which are stiffer, thereby giving a progressive opening to the auxiliary air supply. A still further progression is obtained in that one of the reeds R1 is weaker than the other, thereby opening slightly in advance. This is also true of the two reeds R.

The main air system has a season regulation. To the pipe AA a hot-air tube from the muffler pipe connects. Surrounding this is an annular space formed by a housing Z, the inner end of which has a series of circular openings Z1. There is a corresponding circle of openings in the carbureter horn at this point, so that by seizing the housing Z by hand and pulling outward against the tension of the spring Z2 the two sets of holes can be locked in different degrees of register and thus regulate a supply of cool air which enters through openings in the housing. In hot weather the holes Z1 are in complete register, admitting the maximum of cool air; in cold weather the holes are out of register and the entire air supply taken from the hot-air pipe through the opening AA. The air supply through the auxiliary valve is always cold.

Gasoline System

The gasoline system in the carbureter remains much as heretofore, but the controlling valve has been redesigned. It has beveled seat GV, with a vertical small diameter guide projecting downward from it. This seating rests in a corresponding bevel in the casting. Both valve and seat are ground with pumice stone. The valve is of meteor metal, which is

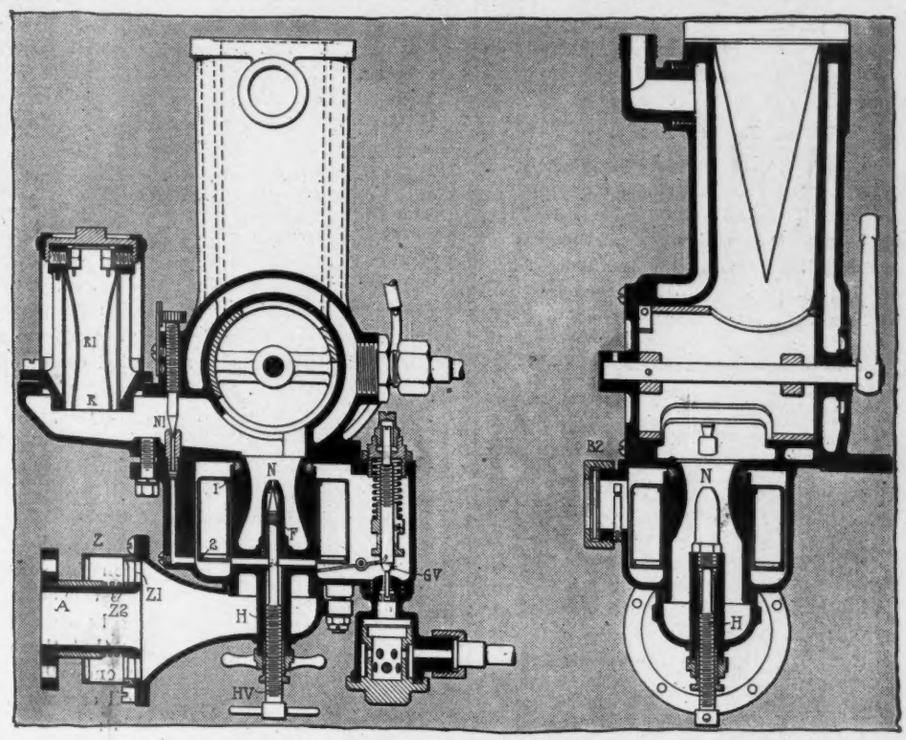


FIG. 7—TWO VERTICAL SECTIONS OF NEW CARBURETER

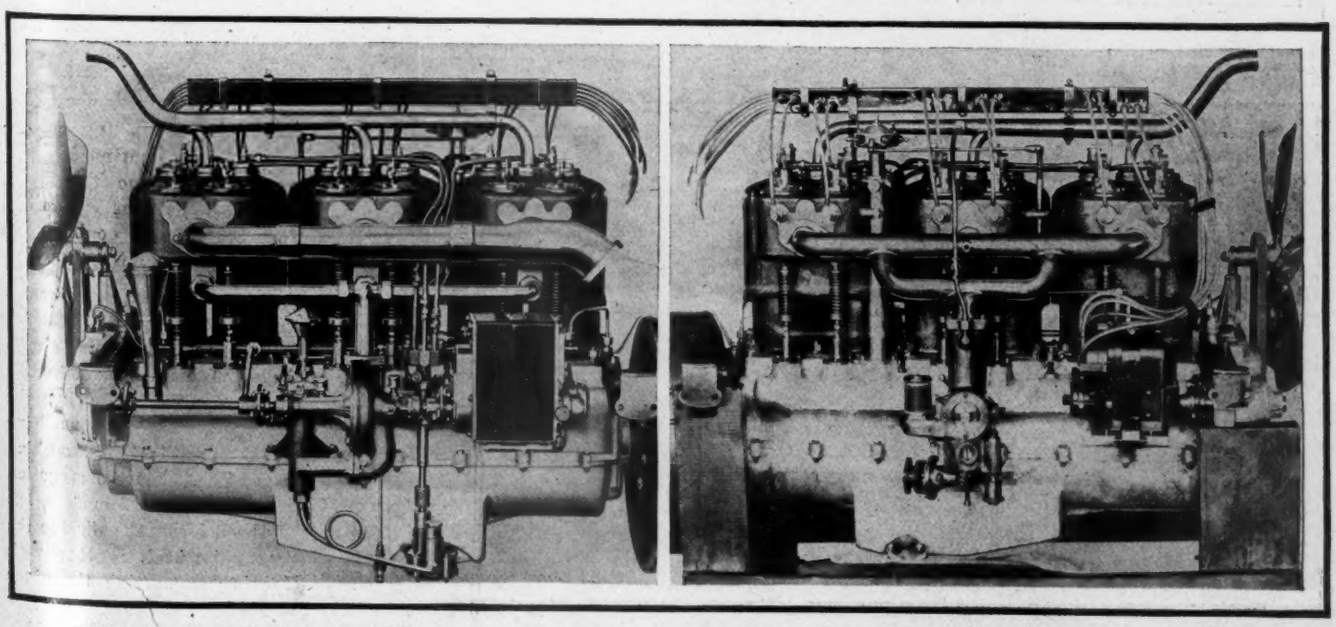


FIG. 8—PIERCE-ARROW MOTOR FOR 1913, SHOWING NEW CARBURETER, LIGHTING GENERATOR, AND SELF-STARTER

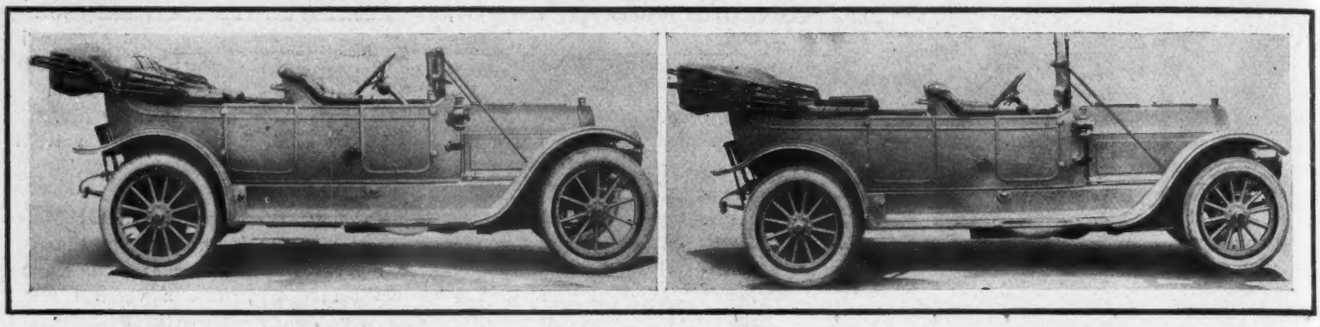


FIG. 9—MODEL 38-C FIVE-PASSENGER TOURING CAR

FIG. 10—MODEL 66-A SEVEN-PASSENGER TOURING CAR

largely nickel, much harder than brass, and so proof against cutting or wearing. To show the gasoline level a bull's eye BZ is placed in the side of the float chamber and in it is a vertical gauge rod on which the proper level of gasoline is indicated.

Clutch and Gearset Design

Leather, with cork inserts, for the facing of the cone clutch, has been used in place of German bronze in that it is lighter and so makes gearshifting easier, as the lighter the cone the more readily will it adapt itself to the gearset speed.

Another clutch improvement which is closely associated with the control parts of the car consists in mounting the clutch rocker shaft on two brackets which are attached to the rear cross support of the motor, this support being an I-beam forging. This year this rocker shaft is supported on the side members of the frame, but in its new position its easy operation is insured in that should the side members of the frame warp, due to road irregularities, there is no danger of it interfering with the easy operation of the clutch.

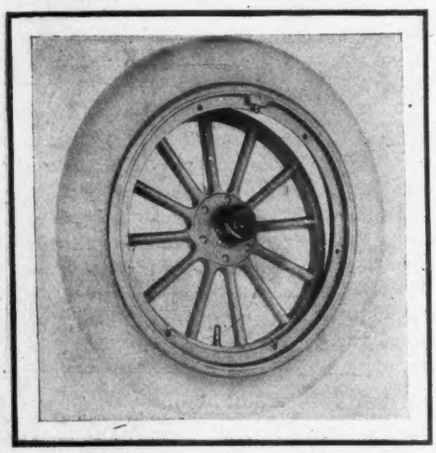


FIG. 11—PIERCE DEMOUNTABLE RIM

The four-speed gearbox, which has been a standard of Pierce construction for several years, is continued in improved form. All of the main shafts are fluted designs, six flutes on each. The rear end of this shaft, where it takes the universal joint member, is also similarly fluted. Both ends of the main shaft are provided with self-adjusting glands to prevent oil leakage. These consist of a packing compressed by a small plunger backed up by spring. The entire stuffing box construction is contained within a cap which holds the bearing in place. Similar stuffing boxes are not used on the countershaft in that there is a bearing cap at the rear end which does not offer any chance for oil escaping, and at the forward end of this shaft the housing of the air pump clutch forms an oil-proof connection with the air pump housing. A new form of interlocking device is used to prevent engaging two trains of gears at the same time. This is an automatic arrangement consisting of a small vertical roller located between the two shifter rods. A slight groove is cut in the adjacent side of the shifter bars at this point, and the width of the roller is such that when resting in one groove the other shifter bar is free to move, but there is not sufficient room for the roller should both bars be removed at the same time. With this simple protective measure the old form of interlocking bolt and quadrant type used to insure the clutching being disengaged before gears could be shifted has been eliminated. There was a time when the company considered such protection necessary, but that time is now past.

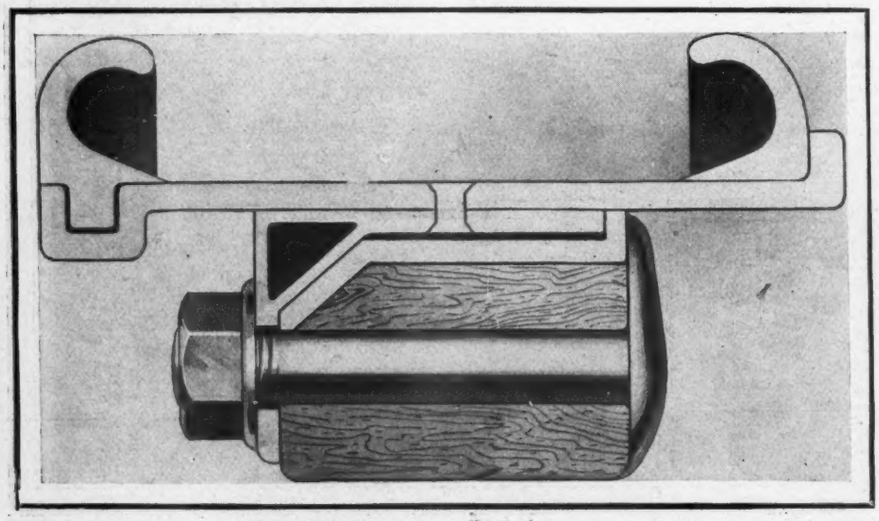


FIG. 12—SECTION OF PIERCE-ARROW DEMOUNTABLE RIM

1913 Transmission Members

Tubular construction has been used in the propeller shaft because of lighter weight and greater strength, there being a reduction of 15 per cent in the weight when compared with solid shafts with increased strength. The added strength is due to the larger diameter which prevents whipping of the shaft and thereby eliminating chattering in the universal joints as well as in the gearbox. On model 66-A the shaft is 2⅛ inches in diameter and of 5/16 stock. A neat method of lubricating is employed for the rear end of the shaft where it takes the sliding joint. The shaft carries six flutes or splines and within it is a packing piston, the forward end being made up of a leather disk between two metal washers, while the rear end is a metal plate fitted against a shoulder on the end of the shaft. Through a plug the chamber between these ends is filled with lubricant which works out through the drilled holes in the shaft. In this particular the hollow propeller shaft is of special merit, as it facilitates and insures adequate lubrication of the slip joint.

On all models the rear axle drive shafts may be withdrawn without dismantling the axle housing. Heretofore, excepting the 66 model, the differential pinions have been keyed to the axle shafts, making withdrawal impossible. The construction is now a floating design on all models, but the removal of the driveshaft calls for the removal of the road wheel together with the Timken bearing supporting the outer end of the axle. There is a flange against which the bearing rests and by which

means the end thrust is absorbed. Axle driveshafts are one-eighth larger in diameter and are fluted at the inner and outer ends instead of being keyed at the inner ends and provided with taper and key at the outer end. On model 66A ten splines are used on either end of the shaft, whereas models 38C and 48B use six splines. For 1913 all models will use a heavy black liquid oil for the bevel gears instead of axle grease. This has called for the introduction of packing glands at either side of the differential to prevent oil working out and getting on the brake drums and wheels. There is a gland at each side, consisting of No. 109 Crandell diagonal packing, which is held between a steel washer resting against a shoulder in the axle sleeve, and a threaded nut at the inner side. As the nut is threaded against the packing the diagonal split allows the halves to gradually slide up against each other, forming a tighter joint. The use of liquid as a lubricant is due to the fact claimed that with axle grease under continuous running at high speeds the grease is thrown off the pinions by centrifugal force and has not time to come back to them.

The axle housing remains practically the same as heretofore and consists of bell-shaped halves to take the differential, these being steel castings, into which Shelby steel tubing, which forms the axle sleeves, is braced and riveted in place. A new and longer pinion housing is used and is fitted with two Hess-Bright bearings to support the shaft. These bearings are now farther apart and the rear one is larger than in previous years, to hold the pinion up to its work better.

Electric Lighting System

The Westinghouse generator mounted on the motor left rear and driven through a continuation of the water pump shaft runs at motor crankshaft speed and will generate sufficient current at 12 miles per hour to supply the lights. The generator weighs 38 pounds and is sufficiently compact as not to interfere with valve spring accessibility for the front cylinder casting. It discharges into an 80-ampere-hour Exide battery and supplies a lamp equipment made up of 20-candlepower headlights,

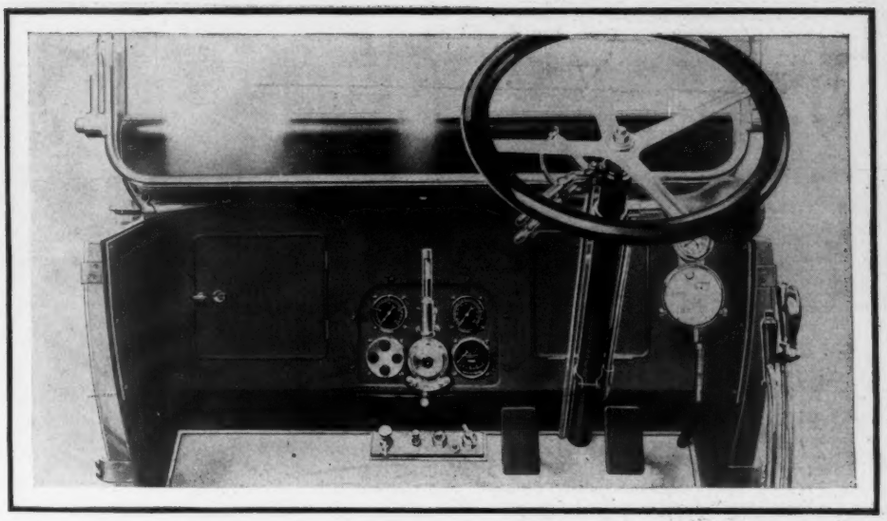


FIG. 13—GENERAL SCHEME OF DASH WITH TOOL COMPARTMENTS

4-candlepower dash lamps, one 4-candlepower tail lamp, a 4-candlepower license lamp and a 1-candlepower gauge light on the dash. All lights take a 6-volt current. The generator is fitted with a magnetic clutch which prevents the battery discharging through the generator when idle. On open cars the amperage consumption for the entire lamp equipment is 10.5 amperes and on the enclosed and suburban types, which have dome and side door lights, the consumption is 11.75 amperes. The wiring is all in copper tubes and the single-wire system is used, that is, the wire leads to the lamp filament and the other end of the filament is grounded. This wiring system for lights is simpler than the double-wire one and permits of a stouter lamp construction. A feature of the generator is that the current is sent through an iron resistance which regulates the voltages and protects the bulbs.

Body and Equipment Changes

All three models use the same general body lines as this year, but the runabout models are roomier, the front seats being 2 inches wide over all. All models are fitted with the new Pierce-Arrow demountable rims in which the wood felloe is beveled to approximately 45 degrees at one side, this bevel extending one-third distance across the felloe top. Over this is fitted a metal band which receives a corresponding band electrically welded to the inner side of the rim taking the tire. A series of six transverse bolts draws the rim's beveled surface up on the band level so that the transverse bolts are not called upon to carry any of the radial load. There is a radial projection on the rim bevel which is brought up tight against the outer side of the wood felloe and at the same time the rim is brought up against a shoulder on the felloe band at the inner side of the felloe.

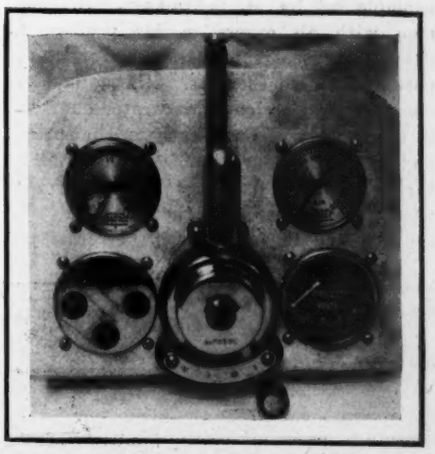


FIG. 14—THE VARIOUS DASH GAUGES

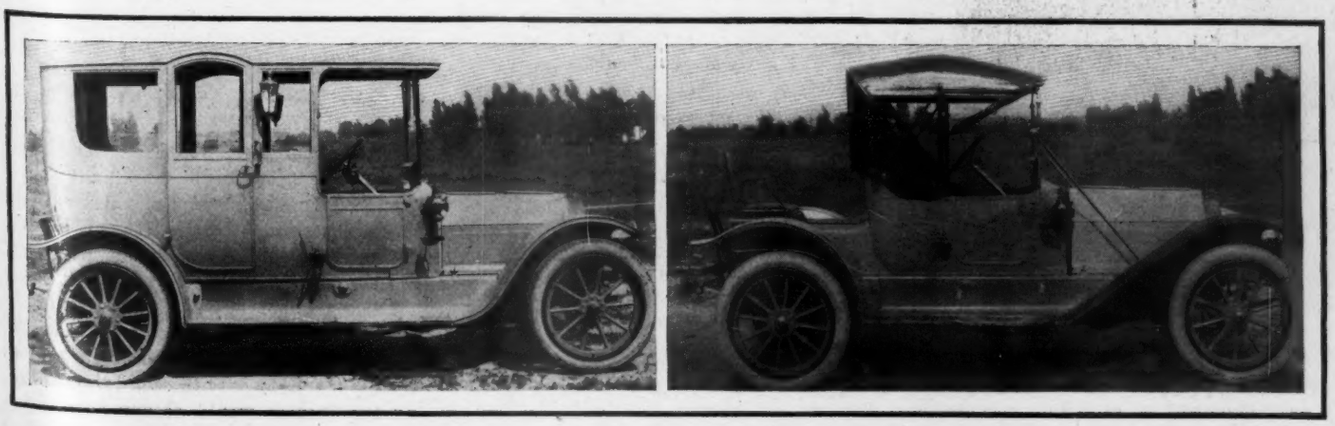
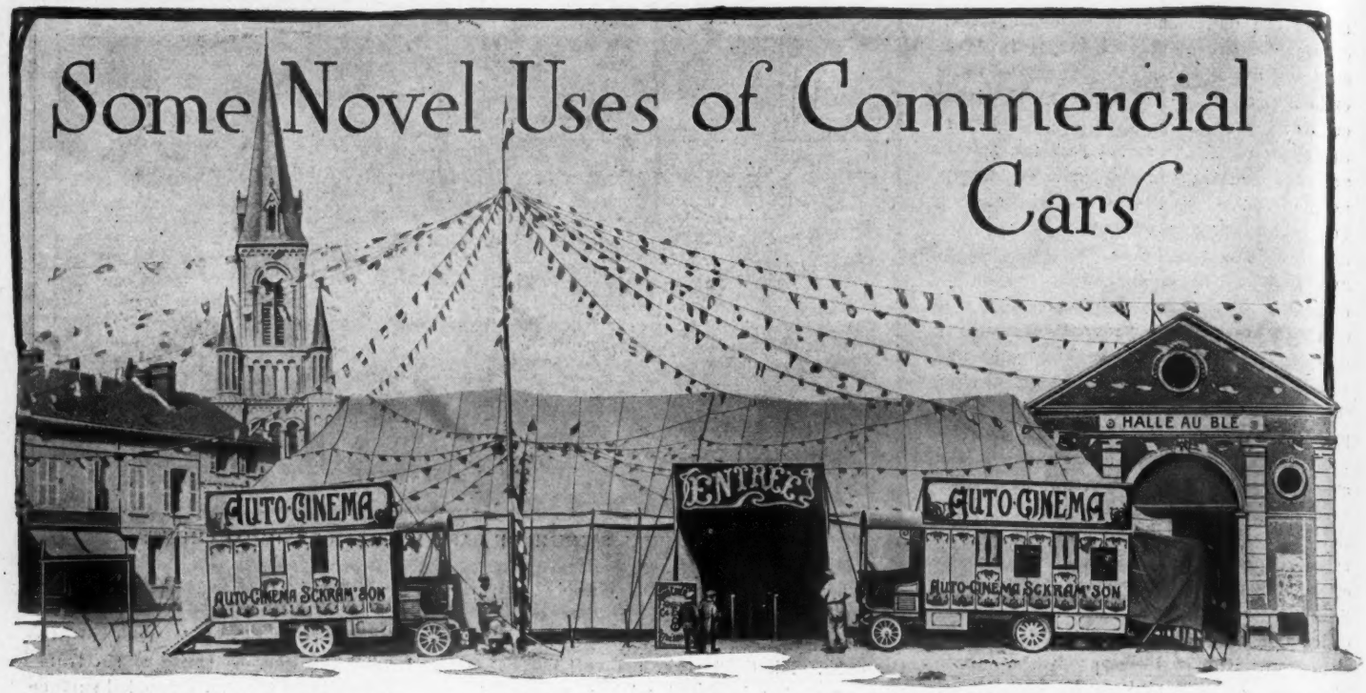


FIG. 15—PIERCE-ARROW BROUGHAM TYPE

FIG. 16—THE STANDARD 1913 RUNABOUT TYPE

Some Novel Uses of Commercial Cars

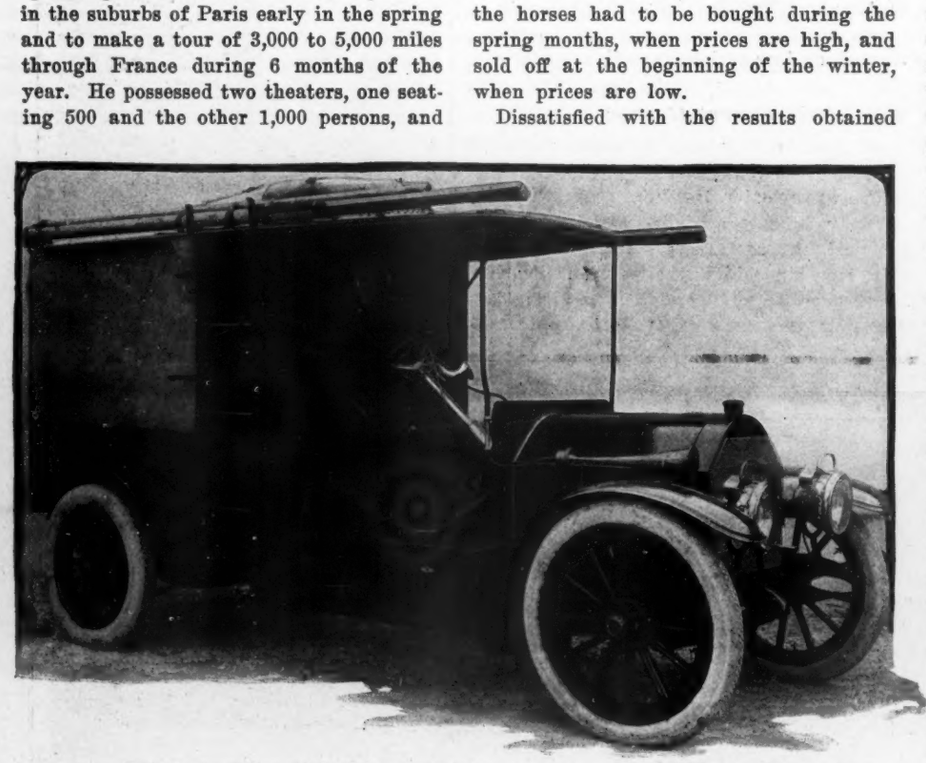


General scheme of moving picture show, in which entire paraphernalia is transported from town to town on motor vehicles. On the vehicles are generators to furnish electric lights for the complete outfit as well as power for same

THE jaded, worn-out horses which have always been an indispensable part of the traveling theaters and variety entertainments so common in most countries of Europe are likely to be withdrawn from further service as the result of an example set by M. Sckramson. In common with all others in his profession, Sckramson used teams of horses for transporting his two theaters. His method of operating was to leave his winter quarters in the suburbs of Paris early in the spring and to make a tour of 3,000 to 5,000 miles through France during 6 months of the year. He possessed two theaters, one seating 500 and the other 1,000 persons, and each one had its own route. For the past few years the kind of entertainment provided was cinematograph exhibitions, with the accompaniment of music.

Under the reign of the horse fourteen animals were required for the two theaters, their cost in food being about 60 cents each per day. On an average six of the fourteen horses were lost every year, being at the rate of one horse per month sold as unfit for service, or killed. Further the horses had to be bought during the spring months, when prices are high, and sold off at the beginning of the winter, when prices are low.

Dissatisfied with the results obtained from his horse teams, Skramson a couple of seasons ago decided to make use of motor cars exclusively. For his small theater he purchased four 15-horsepower de Dion-Bouton chassis, one of which was fitted with a closed body having elaborate living accommodations and means for converting it into an advance booking office; another was a closed van with dismountable sides used for transporting the machinery, and the third and fourth were ordinary trucks carrying the tent, seats and other material necessary for the theater. These two vehicles remained empty when the theater was erected. In addition there were a couple of 8-horsepower generating sets providing the necessary current for lighting the theater, and two small touring cars, one of which carried the manager and his assistant and the other the orchestra of four performers.



Austrian-Daimler car fitted with body especially designed for wireless telegraphy in the army. The car has a dynamo which supplies current for searchlights and also the high frequency dynamo for the telegraphy outfit

The large theater was carried on three de Dion-Bouton 30-horsepower trucks, each one having a capacity of 5 tons. One was a comfortable caravan with sleeping accommodations for owner and assistant, and a compartment set apart as booking and general office. Another closed van carried the cinematograph apparatus and a 12-horsepower generating set for lighting the theater, and had also sleeping accommodations for two mechanics. The third was an ordinary truck with platform body on which was mounted all the material necessary for the theater. As in the case of the small equipment there were two touring cars for carrying the staff.

At the commencement of the season each theater was given a route to be followed during the following 6 months, with orders to stay one night only in each town. Erecting the theater would occupy from 1 to 2.5 hours, according to the ground availa-

ble. The performance began at 9 o'clock and finished at 11:30. Half an hour later everything would be dismounted and the entire troupe would have retired for the night. At 9 o'clock next morning the team would be on the road for the following town, from 12 to 15 miles away, the journey being made in 1 hour to 1.5 hours. When the theater had been erected, an advertising round of the town would be made with the orchestra as an attraction, and both cars liberally decorated with posters. The sensational visit announced, it was only necessary to await the arrival of the crowds at 9 o'clock, give the entertainment, and move along next day.

The adoption of mechanical traction has proved successful in every respect. Not only can a greater amount of ground be covered in a much shorter time, but the cost of operating is less than with horses. A journey of 12 miles, which is the average distance between towns, entailed an expenditure of $8.40 for food for the horses. A journey of 12 miles, which is the average distance between towns, entailed an expediture of $8.40 for food for the horses. The four motors attached to the small theater cover the same distance at a cost of $2 for gasoline and oil. The initial outlay is greater, but the annual depreciation is less than the loss on the sale of the horses, and according to the proprietor of the theater the use of motor cars constitutes a valuable advertising asset.

MOTOR CARS AND THE WIRELESS

The Austrian corps of engineers has been recently equipped with a transportable military station for wireless telegraphy according to the musical-quenched-spark system of Siemens Brothers. This may be said to embody a remarkable and most promising advance in so far as it is mounted on a motor car with which it is combined to a transportable system, the car motor serving at the same time as prime mover of the current generator.

Interior of Austrian-Daimler car, showing arrangement of electrical apparatus for wireless telegraph outfit

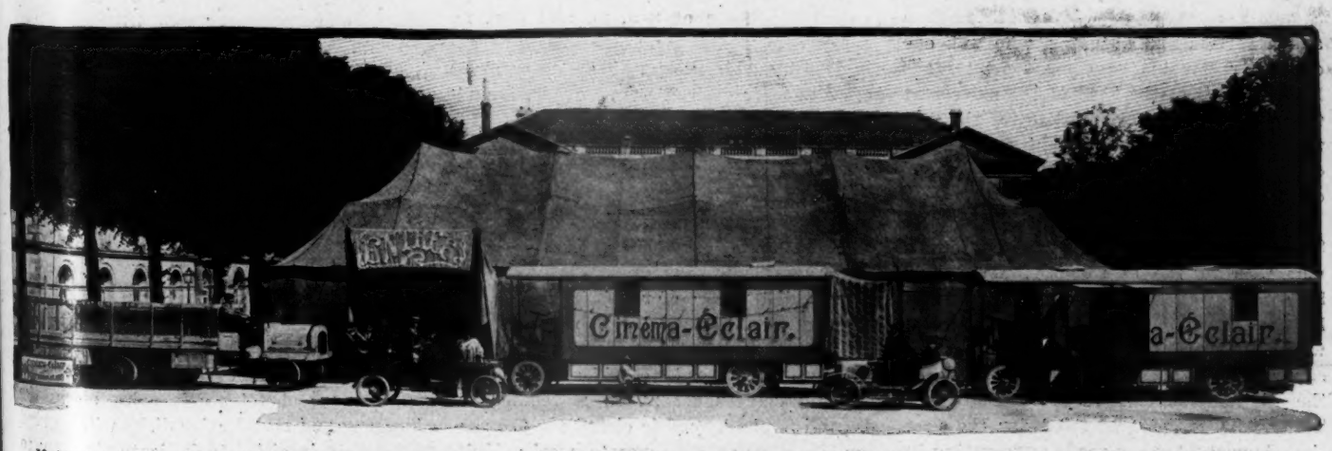
The Austrian Daimler Motor Co., which already has constructed a number of similar military vehicles in connection with which the motor at the same time served to drive the dynamo supplying current to huge search-lights, also designed this novel type of car. After throwing a claw clutch into gear by means of a transversal chain, the four-cylinder motor is made to drive the high-frequency alternating-current dynamo located below the driver's seat and its continuous-current exciter dynamo, thus producing the required energy of about 2 kilowatts.

The only distinctive feature of the motor is a self-acting regulator controlling any fluctuation in the number of revolutions for driving the dynamo and which is combined with a hand regulator intended for effecting any voluntary alteration in the number of revolutions in accordance with the various wave lengths required in wireless telegraphy. Both the generator dynamo and its exciter are, of course, readily accessible.

In the interior of the body, fitted with a light roofing and designed as light open box, the switchboard is arranged behind the driver's seat and at the same wall any apparatus of the sending and receiving posts. The antenna which is made is made up of a telescoping mast 100 feet in height and an umbrella-shaped network of wires, can be folded up within a few minutes to very small dimensions, so as to be carried on the roof of the car.

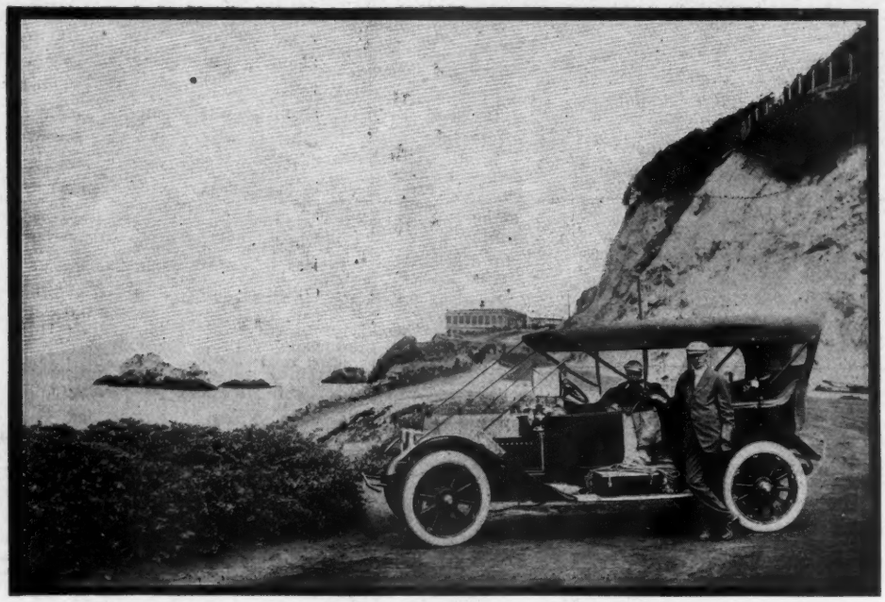
The seats are so arranged as to allow five men in addition to the driver and his attendant to be readily posted in the interior, three seats being arranged in the direction of traveling with a folding seat in the middle and two seats facing each other at both sides of the rear entrance. The three men seated in front are able in a comfortable posture to control all the apparatus. The inside of the car can be locked by folding blinds, which not only afford protection against bad weather, but keep away any outside noise as indispensable in recording wireless messages.

This is how a wireless station permanently in working order can be transported with a crew of seven men and at any speed up to 25 miles.



Motor-driven moving picture outfit, showing two enclosed vans, large truck, and two motor cars necessary for the operation of the outfit. This entire outfit has proven cheaper than horses

From the Four Winds



RICHARD SHELDON AND FAMILY OF TOLEDO, O., AT OCEAN DRIVEWAY, SAN FRANCISCO, AFTER TRANSCONTINENTAL TOUR IN CHALMERS SIX

CHURCHES Object to Cutouts—The churches of Freeport, Ill., have united to oppose the noise made by the open muffler and they asked for an ordinance which prohibits a car being driven in the city limits with the cutout open. Church services are seriously disturbed by passing cars.

Makes Long Trip—Boosting transcontinental touring for the amateur, Richard Sheldon, a Toledo, Ohio motor enthusiast, drove his Chalmers six into San Francisco recently, having made the trip from his home in 19 days, actual running time. Mr. Sheldon was accompanied by his wife and young son. The party now is touring in southern California.

Club Planned at Madison—Madison, the capital of Wisconsin, will organize a motor club before the end of August. A. M. Stondall, a wealthy resident of Madison and a former state senator, who was one of the leaders in the present good roads legislation, is at the head of the movement to organize Madison motorists for the first time. It is proposed to organize as a stock corporation and build a club house on one of the four noted lakes at Madison.

Awarding State-Aid Bids—The Ohio State Highway Commission has taken a new plan in the award of the state-aid highways of the state. Instead of awarding the contracts in the various counties where the work is to be done, all future contracts will be awarded at the office of the highway commissioner in Columbus. The new plan will be tried for the first time August 22, when roads aggregating in value more than $200,000 will be contracted for. One of the new departures of the Ohio State Highway Commission in the improvement of the roads is concrete construction in preference to water-bound macadam. The former costs only 21 per cent more than the latter and is believed to be much more serviceable.

Mississippi Using Convicts—Not to be outdone by the good roads activity in Louisiana, Governor Earl Brewer, of Mississippi, has ordered work started on the first link of a model road that will connect the Tennessee border with the gulf coast. Four hundred convicts have been put to work on the roadway, which has been started at Indianola.

Swiss Bar Motorists—The latest restriction to Sunday motoring in Switzerland is the prohibition of the use of the roads in the canton of Schwytz by motorists between the hours of 8 a. m. and 5 p. m. Doctors and military authorities are exempt from this ruling. This order shuts off a number of well-known roads, including the famous Axenstrasse.

Wisconsin Roads Closed—H. J. Kuelling, county highway commissioner at Milwaukee, Wis., has issued notice of closing of most of the main trunk highways leading to Chicago and other cities on account of permanent improvements. The Kilbourn road, which is part of the Chicago-Milwaukee improved highway, is being rebuilt of concrete 16 and 18 feet wide. Loomis road, another trunk road to Chicago, will be closed from August 22 to November 15. Janesville plank road is closed for the season on account of concrete work; Mukwanago road is being graded. Watertown plank road, a principal exit from Milwaukee westward, is being paved with Kettle river sandstone and concrete and will be closed until the end of September.

Louisiana Has a New One—In order to be of more assistance to the good roads movement in Barbour county, Alabama, motor car owners in Eufaula have formed the Eufaula Automobile Association. The following officers were elected: T. L. Moore, president; C. B. Mercer, vice-president; J. Oppenheimer, secretary and treasurer.

Bars Young Drivers—An ordinance has been adopted by the city council of Coshocton, Ohio, requiring all drivers of motor cars within the city limits to be at least 16 years of age. The ordinance was adopted to prohibit young children driving cars through the streets. A fine of from $2 to $25 is provided for violation of the ordinance.

Ohio Registering Many Cars—The state of Ohio has been enriched the sum of $260,000 from the registration of motor cars and chauffeurs during the first 7 months of the present year. During the whole of 1912 the revenue was $190,000, while net profits for the first 7 months of this year is $70,000 in excess of that amount. Up to August 1 the number of number plates given out was 58,442, as compared with 45,000 for the whole of 1911.

New York's Club Strength—Figures just published showing the growth of the motor clubs in New York state outside of New York city are distinctly encouraging, demonstrating big gains over the previous year. Syracuse, with 945 members, stands third in the list, being exceeded by Buffalo, with 3,285 members, and Rochester with 1,603. Utica has 340 and Cortland 284. The smallest club in the state is Amsterdam, with seven members.

Marking Routes by Colors—The New York State Automobile Association, through efforts of Secretary Frank D. Lyon, is planning to designate through that state various highway routes by colors for convenience of motorists. The coloring process is to be undertaken by the New York state highway department and the various local clubs. Various colors will be assigned to the different roads through the state. The highway department probably will paint the top rail of all fences erected by the state highway division the specific color assigned to that road, and an 18-inch strip of color on bridges along the highways. A band of color is to be placed on telephone and telegraph poles along the highway and round color disks will be used on streets in cities to indicate the way to touring motorists. Later maps will be is-

sued by the state association showing the various colors allotted to the different routes and much confusion will be prevented when motorists have these guides for reference.

New Wisconsin Club—The Crawford County Motor Association has been organized at Prairie du Chien, Wis., with forty members. Officers have been elected as follows: President, James Fischer; vice-president, F. J. Antoine; secretary, Harry Pomeroy; treasurer, O. A. Sherwood; directors, the officers and Dr. R. W. White, Oscar Bieloh, Henry Tilley and T. F. Clancy. The club is located in the city which will be the western terminus of the proposed Across-Wisconsin highway from Milwaukee, on Lake Michigan, to the Mississippi river, at that point joining one of the across-the-state roads of Iowa.

Mexico Gets Busy—The recent organization of the Monterey Good Roads Association marks the inauguration of a campaign which has for its purpose the construction of a highway to run between the crossing of the Rio Grande at Laredo, Tex., and the City of Mexico, a distance of approximately 900 miles. It is stated that this good road movement not only has the hearty endorsement of President Francisco I. Madero, Jr., but that it is probable that the federal govement will lend material financial aid in the construction of the proposed highway. It is stated by engineers who have gone over the route that no serious construction difficulty will be encountered in accomplishing the project. There already exist several sections of old government roads that can be used as links in the through road, it is claimed. The different states and towns through which the highway will pass are giving their aid to the project and there is every reason to believe that it will be carried out. Special interest is felt by the Monterey Good Roads Association in the construction of the link between Monterey and Laredo, as it will give Monterey city a good road outlet to the United States via that international gateway.

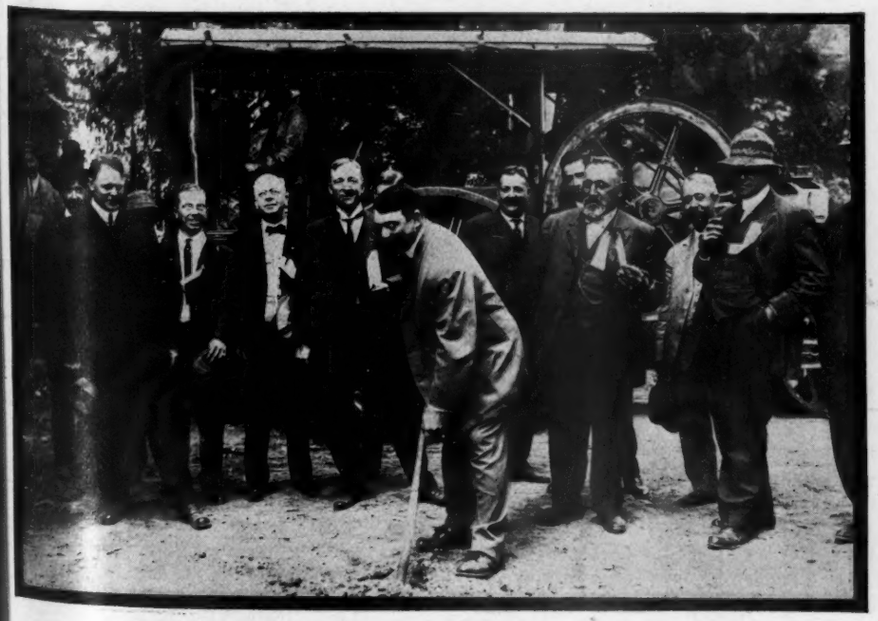
BOY FINDS NEW WAY TO STEAL RIDE ON PATHFINDER

Motorists Pick Up Stones—Motorists of Horicon, Wis., recently organized a party of fifty enthusiasts to pick stones from the highways leading into the city. Ten miles of road were cleared of rocks in 3 days. The stones were loaded on wagons and hauled to the city, where they will be crushed and used for macadam road building.

Kenosha Boosting—A. R. Hirst, state highway engineer of Wisconsin, was the principal speaker at the last meeting of the Kenosha Automobile Club of Kenosha, Wis. The meeting was devoted to stimulating interest in the proposed permanent improvement of that part of the lake shore road from Chicago to Milwaukee which lies in Kenosha county. A large part of the $6,400 fund needed to build a concrete road on the sandy highway now existing has already been raised by popular subscription. The road will be 14 feet wide and cost $400 for grading and $6,000 for concrete.

San Antonio Books Meet—At a recent meeting of the board of directors of the chamber of commerce of San Antonio, Tex., it was decided that a race meet will be held October 24, 26, 27, as a feature of the annual harvest jubilee. Prizes aggregating $3,000 will be offered. Dr. W. A. Hering, of the San Antonio Automobile Club, was selected chairman of the committee which will look after the matter.

Wisconsin Fees — Milwaukee county, Wis., will receive the sum of $17,420.82 as returns on the payment of motor registration fees to the state during the fiscal year of 1911-12. The registration law provides that after the secretary of state pays the expenses of administration of the registration division, the remainder shall be distributed pro rata among the counties. The counties must use the returns for good roads purposes.



BREAKING GROUND FOR CALI FORNIA'S $10,000,000 HIGHWAY

Illinois Roads Marked—The Illinois Valley Automobile Association has been active in signboarding work, having just completed marking the Aurora-Ottawa-Starved Rock, Ill., route. Blue stripes are to be found on the telephone poles on this route via Oswego, Yorkville and Newark, while a white band directs the motorist through Plano, Sandwick and Somonauk, the latter being considered the better route to Starved Rock.

Cars in British Columbia—Figures supplied by the provincial police, who handle motor licenses, show that 3,568 machines have been registered in British Columbia. Of these it is estimated that about 1,800, or a little more than half, are issued from the Vancouver office, covering the city of Vancouver, New Westminster, North and South Vancouver and all the adjoining municipalities.

Current Motor Car Patents

PATENTS ISSUED AUGUST 13, 1912.

1,035,138—Vehicle Tire. Frank M. Ashley, New York, N. Y. Filed February 12, 1910. Serial No. 543,463.

1,035,150—Starting Device for Explosion Engines. Wilmur W. Boa and Karl Schoenbauer, Grand Rapids, Mich. Filed May 15, 1911. Serial No. 627,232.

1,035,152—Speed Transmission Mechanism. Leon J. Campbell, Chicago, Ill. Filed January 23, 1911. Serial No. 604,060.

1,035,155—Friction Transmission Mechanism. Harry B. Clark, San Francisco, Cal., assignor of one-third to Carlos P. Griffin and one-third to John J. Duffie, San Francisco, Cal. Filed August 28, 1911. Serial No. 646,514.

1,035,156—Lubricator. Robert D. Clark, Duquesne, Pa. Filed March 6, 1912. Serial No. 681,943.

1,035,167—Battery-Plate. Eben G. Dodge, South Orange, N. J. Filed December 26, 1908. Serial No. 469,240. Renewed November 4, 1911. Serial No. 658,617.

1,035,169—Speedometer Drive for Motor Cars. Emil R. Draver, Richmond, Ind. Filed February 8, 1911. Serial No. 607,267.

1,035,181—Motor Car Wheel. Luther J. Graham, Richmond, Cal., assignor of one-half to Ananias Hill, Richmond, Cal. Filed May 29, 1911. Serial No. 630,004.

1,035,185—Valve for Pneumatic Tires. William P. Hammond, New York, N. Y., and Theodore A. Hammond, Passaic, N. J. Filed January 17, 1907. Serial No. 352,791.

1,035,207—Vehicle Wheel. John K. Libby, Malden, Mass. Filed December 15, 1910. Serial No. 597,416.

1,035,232—Starting Device for Explosive Engines. Winfield S. Regur, Des Moines, Iowa. Filed September 10, 1909. Serial No. 517,028.

1,035,234—Internal Combustion Machine. Emile Victor Reno and Joseph Alfred Chrysostome Bois, La Garenne-Colombes, France, assignors, by mesne assignments, to Sphinx Motor Co., New York, N. Y., a corporation of Delaware. Filed April 14, 1910. Serial No. 555,454. Renewed October 16, 1911. Serial No. 654,801.

1,035,246—Spring Top-Support for Vehicles. Frank X. Schad, Gainesville, Texas. Filed November 22, 1911. Serial No. 661,738.

1,035,252—Rotary Engine. Reinold V. Smith, Salt Lake City, Utah, assignor to Arvis Motor Co., Salt Lake City, Utah, a corporation of Utah. Filed September 10, 1910. Serial No. 581,394.

1,035,283—Self-Inflating and Non-Collapsible Pneumatic Tire. Frank F. Wear, San Francisco, Cal., assignor to himself, as trustee. Filed November 23, 1910. Serial No. 593,917.

1,035,332—Buffer for Motor Cars. Frederick C. Fehrman, Groffs Store, Pa. Filed September 22, 1911. Serial No. 650,677.

1,035,346—Friction Clutch. William J. Hilliard, Elmira, N. Y., assignor to Charles H. Knipp, Elmira, N. Y. Filed December 3, 1910. Serial No. 595,452. Renewed March 30, 1912. Serial No. 687,525.

1,035,356—Starting Device for Explosive Engines. Peter W. Kane, Chicago, Ill., assignor to Kane Machinery Co., a corporation of Illinois. Filed April 1, 1911. Serial No. 618,277.

1,035,367—Resilient Wheel. August Loock, Hayfield, Iowa. Filed May 29, 1912. Serial No. 700,500.

1,035,369—Mounting Bracket. Ray H. Manson, Elyria, Ohio, assignor to the Dean Electric Co., Elyria, Ohio, a corporation of Ohio. Original application filed August 14, 1911, Serial No. 643,829. Divided and this application filed March 29, 1912. Serial No. 687,143.

1,035,381—Chock. Thomas J. Moss, St. Louis, Mo. Filed April 5, 1912. Serial No. 688,818.

1,035,383—Starting Mechanism for Internal Combustion Engines. Pierre Antonio Painchaud, Plessisville, Quebec, Canada. Filed October 5, 1911. Serial No. 653,023.

1,035,391—Internal Combustion Engine Cylinder. Horatio S. Simpson, Fairbury, Neb., assignor of one-half to C. H. Shaffer, Fairbury, Neb. Filed December 2, 1910. Serial No. 595,276.

1,035,404—Vehicle Axle. Edwin E. Arnold, Detroit, Mich. Filed May 4, 1912. Serial No. 695,052.

1,035,410—Spring Wheel. Frank M. Beydler, Ashland, Kans. Filed June 24, 1911. Serial No. 635,054.

1,035,421—Hub-Bearing. Scott R. Coppins, Princeton, Ill., assignor of one-half to Sam S. Evans, Princeton, Ill. Filed May 26, 1911. Serial No. 629,698.

1,035,424—Pneumatic Wheel. Charles De Los Rice, Hartford, Conn. Filed November 29, 1908. Serial No. 464,855.

1,035,446—Spring Wheel. Jacob Kamppi, Elsie, Ore. Filed November 30, 1910. Serial No. 594,969.

1,035,454—Internal Combustion Power Apparatus. Isaac N. Lewis, U. S. Army. Filed March 29, 1909. Serial No. 486,615.

1,035,456—Tire Emplacing Tool. Thomas W. Lucke, Chicago, Ill. Filed September 6, 1910. Serial No. 580,594.

1,035,461—Motor Car. Alva Montel, Claypool, Ind. Filed March 21, 1912. Serial No. 685,342.

1,035,463—Ball Bearing. Edwin Oldfield, Norwich, Conn. Filed October 8, 1910. Serial No. 585,915.

1,035,473—Tire. Angelo C. Rovelli, Philadelphia, Pa., assignor of one-half to Max Strozzi, Philadelphia, Pa. Filed November 14, 1911. Serial No. 660,196.

1,035,474—Caloric Engine. John N. Ruffin, New York, N. Y. Filed December 4, 1911. Serial No. 663,950.

1,035,478—Fluid Clutch. Charles A. Sawtelle, Sacramento, Cal. Filed July 20, 1911. Serial No. 639,526.

1,035,487—Vehicle Tire. George E. Sarn, Camden, N. J., assignor, by mesne assignments, to Starn Tire Mfg. Co., Camden, N. J., a corporation of New Jersey. Filed April 23, 1910. Serial No. 557,229.

1,035,488—Gas Engine. Benjamin F. Stewart. Chicago, Ill. Original application filed September 11, 1907, Serial No. 393,340. Divided and this application filed July 11, 1910. Serial No. 571,526.

1,035,497—Motor Car Lamp Attachment. Arthur Gale Thompson, San Francisco, Cal. Filed December 8, 1908. Serial No. 466,447.

1,035,503—Gear Shifter. Albert C. Webb, St. Louis, Mo., assignor to the Webb Motor Fire Apparatus Co., St. Louis, Mo., a corporation of Delaware. Filed July 10, 1911. Serial No. 637,744.

1,035,504—Headlight. Charles I. Williams, Utica, N. Y. Filed April 1, 1911. Serial No. 618,475.

1,035,506—Revolving Track and Car Therefor. William H. Williams, Statesboro, Ga. Filed January 20, 1912. Serial No. 672,422.

1,035,513 — Internal Combustion Engine. Gustav A. F. Ahlberg, Chicago, Ill. Filed November 28, 1910. Serial No. 594,520.

1,035,528—Upholstering Motor Cars and Other Vehicles. Max Alvinus Buch, Birmingham, England. Filed March 30, 1912. Serial No. 687,415.

1,035,556—Spring Wheel. George Doerffel, Oakland, Cal. Filed September 14, 1910. Serial No. 582,011.

1,035,586—Grip Thread for Elastic Tires. Carlton L. Hoff, York, Pa. Filed June 15, 1915. Serial No. 567,085.

1,035,600—Internal Combustion Engine. Charles C. Keyser, Pensacola, Fla. Filed December 22, 1911. Serial No. 667,310.

1,035,610—Motor Car Bumper. Friedrich Lederer, Milwaukee, Wis. Filed May 29, 1911. Serial No. 630,129.

1,035,614—Vaporizing Device for Explosive Engines. Abbot A. Low, Horsehoe, and Harry Hertzberg, New York, N. Y.; said Hertzberg assignor to said Low. Filed May 16, 1908. Serial No. 433,238.

1,035,625—Wheel. Joseph E. McWilliams, Hitchcock, Okla. Filed February 19, 1912. Serial No. 678,494.

1,035,651—Auxiliary Air Valve for Carbureters. Alfred C. Stewart, Los Angeles, Cal. Filed October 3, 1911. Serial No. 652,637.

1,035,653—Gasoline Filter. Frederick H. Stubbe, New York, N. Y., assignor of one-half to John C. Klatzl, New York, N. Y. Filed March 6, 1912. Serial No. 681,901.

1,035,654—Power Transmission Mechanism. Jacob Swanson, Davenport, Iowa. Filed January 16, 1912. Serial No. 671,520.

1,035,668 — Headlight Turner. Ed Lee Wickett, Keithsburg, Ill. Filed January 2, 1912. Serial No. 668,854.

1,035,669—Friction Clutch. Louis W. Witry, Waterloo, Iowa, assignor to Waterloo Gasoline Engine Co., Waterloo, Iowa. Filed October 2, 1911. Serial No. 652,318.

1,035,745—Alarm or Acoustic Apparatus. Ernest Rubes, Brooklyn, N. Y. Filed January 11, 1911. Serial No. 602,001.

1,035,746—Alarm or Acoustic Apparatus. Ernest Rubes, Brooklyn, N. Y. Filed January 11, 1911. Serial No. 602,002.

1,035,749—Apparatus for Making Tires. Joseph Norman Satterthwaite, Trenton, N. J., assignor to Empire Tire Co., Trenton, N. J., a corporation of New Jersey. Filed December 2, 1911. Serial No. 663,502.

FRENCH Piston-Valve Motor—No. 1,035,234—Emile Victor Reno and Joseph Alfred Chrysostome Bois, La Garrenne-Columbres, France, assignors by mesne assignments to Sphynx Motor Co., New York City. Filed April 24, 1910, renewed October 16, 1911, dated August 13, 1912. Novel in the location, operation and manner of actuation of a piston valve, this invention consists of the application to an otherwise standard gas-engine design of a cylindrical valve chamber in the cylinder head, with ports in its lateral walls, having a piston valve within it, actuated by means of a cam, push-rod and rocker mechanism. This piston has a short vertical stroke and assumes progressively, positions wherein the upper port is opened, both ports are closed, and wherein the lower port is opened, as directed by the valve linkage. This is connected to the cam by a frame provided with opposed rollers, which bear on both sides of the cam, which is so cut and timed to the engine as to alternately raise and lower the aforementioned connections to it, in such a manner as to effect the necessary openings and closures for the engine cycle.

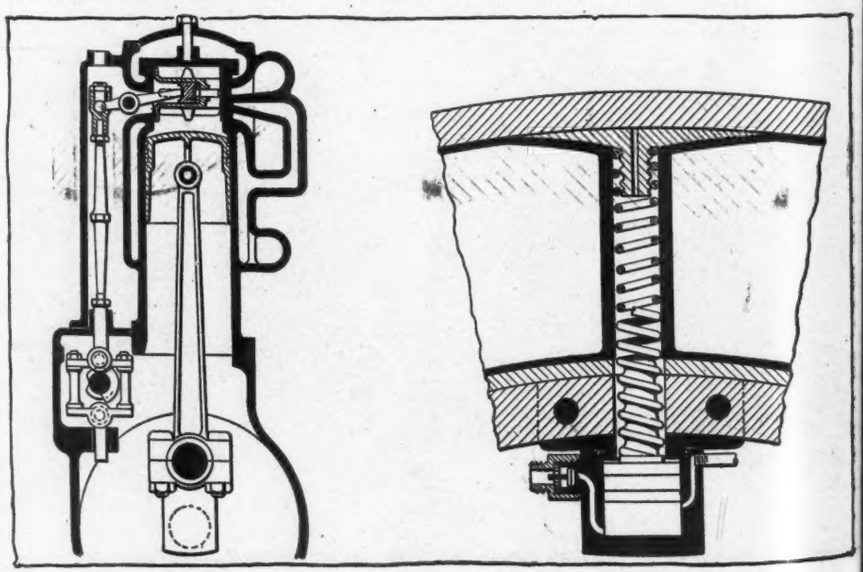


FIG. 1—SPHYNX MOTOR AND SELF-INFLATING TIRE

This arrangement permits the use of a cam or eccentric, without the use of springs. It permits the use of valves in the head, without employing poppet valves; and it permits a piston or sleeve port action without the use of a sleeve or sleeves, necessitating, therefore, but little departure from standard practice to adapt a design to the use of this type of valve.

Stewart Auxiliary Air Valve—No. 1,035,651, Alfred C. Stewart, Los Angeles, Calif. Filed October 3, 1911, dated August 13, 1912. To render additional flexibility to the carburetion of a gas-engine, this invention consists of a manually-controlled air inlet designed to be disposed between the carbureter and the intake manifold. The device consists of a short pipe, provided with flanges to adapt it to interposition between the manifold and carbureter, the diameter of its inner passage conforming with the diameter of the opening at the points of interposition. Entering this opening at a spiral, the auxiliary air passage opens at a tangent to this passage, terminating in a perforated tube, within which a piston valve reciprocates as controlled by a suitable connection to a manual control. This piston valve is normally closed, being held so by the suction of the engine, seating in a bevelled aperture, nearest the tangentical opening to the gas passage, being drawn back and opening progressively the perforations of the tube in which it is disposed, as controlled by such a device as a bowden wire, as shown in Fig. 1. The spiral introduction thus, of fresh air into a carbureted gas has a tendency to form a more homogeneous mixture, than if the passage were direct, as the tendency of the latter method of introduction would be to striate the air within the gas, whereas the spiral admixture tends to distribute the air in the form of a thin sheet about the gas column, homogenizing readily.

Self-Inflating, Non-Collapsible Tire—No. 1,035,283—Frank F. Wear, San Francisco, Calif., assignor to himself as trustee. Filed November 23, 1910, dated August 13, 1912. Designed to prevent rim-cutting and underinflation, this patent relates to a tire composed of sectional inner tubes, inclosed within a casing, similar to the ordinary pneumatic tire casing, with spring plunger pumps disposed between the tube sections. These pumps are mounted on the felloe of the wheel, and consist of an external cylinder, within which a small piston reciprocates as controlled by a spring plunger, extending into the tire, and bearing on its lateral interior surface. This plunger is placed between two pneumatic sections, and is so acted upon by a helical spring as to induce reciprocal movement on the part of the pump piston, in response to the displacement of the tire as it passes over inequalities in the road. Air is admitted to the pump cylinder through a check-valve, and is discharged on the instroke through a small passage to the tube. The action, therefore is to further inflate the tube on each compression of the tire, the greater pressure induced by such inflation rendering the tire less responsive to the effect of inequalities, and the action of the pump being thus restricted. Absolute deflation is prevented by the expansion of the tire by the springs. It is presumed that some means would be employed, in actual construction, to prevent over-inflation.

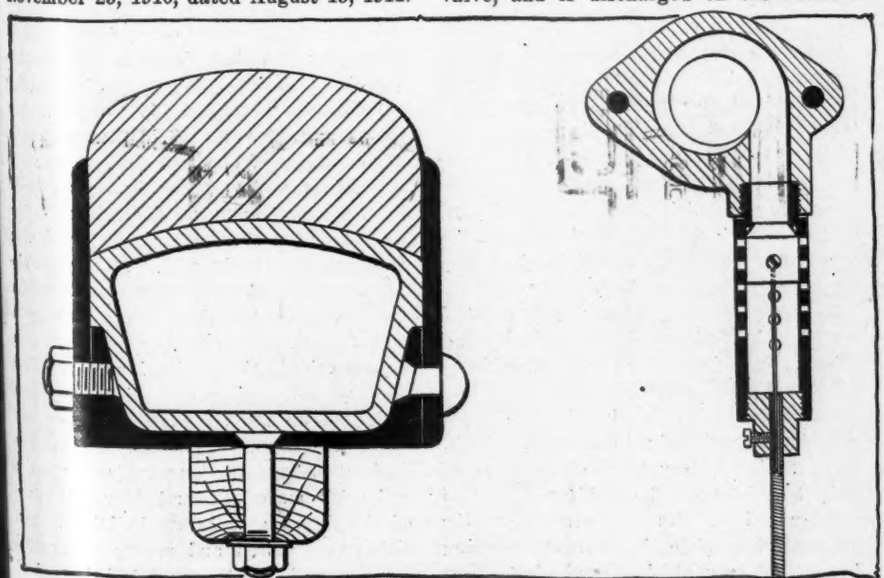


FIG. 2—STARN PUNCTURE-PROOF TIRE AND STEWART AIR INJECTOR

Punctureless Pneumatic Tire—No. 1,035,487—George E. Starn, Camden, N. J., assignor, by mesne assignments, to Starn Tire and Mfg. Co., Camden, N. J. Filed April 23, 1910, dated August 13, 1912. Comprising a heavy single tube pneumatic envelope, disposed on three sides within a channelled steel rim, which extends outward sufficiently to enclose the greater portion of the sides of a solid rubber thread, this construction is designed to possess more resiliency than a solid tire, yet retain its freedom from the troubles attendant upon most tires of pneumatic character. The rim is composed of a felloe band, which forms the base of the rim, an inside side plate, riveted to the former, and an outside plate of substantially the same size as the inside one, but bolted to the felloe band, to permit its removal and the detaching of the tire members. The latter portions of the assembly consist of an inflatable tube, moulded to conform to the shape of the rim, and of radial form on its outer face, and a solid tread member of sufficient thickness to prevent puncture of the inner tube, whose inner surface conforms to the radial form of the outer face of the tube, and whose outer surface is of the same radial character, forming a rounded tread surface.

The Motorists' Bookman

Panama—Past and Present

AMONG the books of intense interest at the present time is "Panama," by Albert Edwards. In charming style the reader is introduced to the semi-tropics on a trip across the Gulf of Mexico, touching at Barbados, a care-free isle, then drawn into strenuous conditions attendant upon securing laborers for the Herculean undertaking of uniting the oceans.

Many chapters are rich with the early history and romance of the isthmus, for Panama has been a vantage point through centuries, a point of centralization, a point of radiation, but soon to enter on a new chapter as a universal benefit to mankind and retrieve its past history of iniquity. Though Mr. Edwards seems inclined toward the just construction of intent and act, he could not make this narrow strand of earth other than a trail of hope, alternating with hatred, blood, intrigue and splendor. With closest interest one traces its fortunes from the days of Columbus, when adventure became history, through the days of rapacious greed for the Incas' treasure, days of the dauntless conquistadors, with now and then a cassocked priest taking prominent place as a sovereign's envoy or humane intercepter for the helpless, enslaved and slaughtered Indians; days of bucaneering on the Spanish main, the palmy days of Porto Bello and the great trade, the wars for independence, and the dawning of the project of uniting the oceans, first by railroad and then by waterway, to these days of the wonders of Culebra cut and the Gatun locks, magnificent achievements of engineering skill, and the diplomatic handling of human forces. The chapters of history prepare the reader for a fuller understanding of this great undertaking. **The Macmillan Co., New York. Price, $1.50 net.**

Among the Makers and Dealers

TESTING REAR AXLE FOR NOISY GEARS AND BRAKE EFFICIENCY IN WESTON-MOTT FACTORY AT FLINT, MICH.

FITZSIMONS Leaving Thomas—George Fitzsimons has resigned his position as sales manager of the E. R. Thomas Motor Car Co., of Buffalo, to take effect September 1.

Webb Jay Changes—Webb Jay, formerly manager of the Chicago Rambler branch, has made a change, having been appointed assistant general manager of the Haynes Automobile Co., with headquarters at Kokomo, Ind.

Groves Speedwell Sales Manager—Frank A. Groves, widely known in the motor car world, has been appointed sales manager of the Speedwell Motor Car Co., of Dayton, O. For the last 5 years Mr. Groves has been Chicago agent for the Speedwell.

To Make Clutches—A clutch operated on a hydraulic principle, for motor cars, will be manufactured by the Hydraulic Transmission Co., which has just been organized in Indianapolis by W. K. Millholland, Paul Millholland and Ernest Millholland, who conduct the W. K. Millholland Machine Co. The Millholland company is a contractor and manufacturer of motor car parts and will be closely allied with the new concern, which is incorporated with an authorized capitalization of $200,000.

Buick Starts 1913 Shipments—The Buick Motor Co. has made its first shipment of assembled cars of the 1913 model from Flint, Mich. A carload went to San Francisco, the first city to receive next year's line of cars. Shipments will be made from day to day to the agencies farthest from Flint in order that the distant points may be served at the same time as the closer ones. At present 3,000 men are on the payroll, the production is 90 days ahead of last year and the shipments are 60 days ahead of time, it is claimed. The Buick company sold approximately 20,000 cars of the 1912 model. The program calls for from 25,000 to 30,000 cars of the 1913 model.

Attica Plant Disposed Of—The motor car plant at Attica, O., which proved a losing venture and has been closed for some time, probably will never be reopened. This was made evident when a deed was filed with the county recorder at Tiffin, O., whereby the Cameron Car Co., of Beverly, Mass., sold its real estate in the village of Attica to the Beverly National Bank.

Swinehart Declares a Dividend—The Swinehart Rubber Co., of Akron, Ohio, has declared a quarterly dividend of 1½ per cent which means the reduction of the regular dividend from 8 to 6 per cent. In a letter sent out with the dividend checks the statement was made that the company deemed it advisable to reduce the dividend and build up a larger working capital.

Jones Trebling Capacity—The Jones speedometer makers are trebling their manufacturing facilities by fully equipping with special improved machinery at Bush Terminal, Brooklyn, an additional factory much larger than its plant at New Rochelle. The New Rochelle factory will be continued at its full capacity, but the general offices and shipping department will, on October 1 next, be removed to Bush Terminal, where with ideal shipping facilities—loading directly to through freight cars at the factory door—4 to 8 days' freight will be saved on shipments to all western points. On the same date the commercial vehicle instrument shipping department now at the Canal place, New York city factory—where the recorders, hub odometers and truck speedometers are made—will be moved to and consolidated with the speedometer service station in the Speedometer building, Broadway and Seventy-sixth street, New York city.

New Stearns Sales Manager—R. H. Williams has been appointed sales manager of the F. B. Stearns Co., Cleveland. Mr. Williams' first connection with the company was that of traveling representative. He then opened up the Pittsburgh and Atlanta fields, establishing branches in both cities. He was then made general traveling representative, his territory covering the entire United States.

Marvel Moving to Michigan—Arrangements are being completed to move the plant of the Marvel Carbureter Co. from Indianapolis to Flint, Mich. A. G. Schonacker, general manager of the company, has just returned from a trip to Michigan, where he consummated a deal for the removal of the plant. The stock has been sold to a number of motor cars manufacturers by the Indianapolis stockholders. Mr. Schonacker will remain with the company as manager in its new location.

Bosch Not to Move—Chief Engineer Elbert Klein of the Bosch Magneto Co.'s plant at Springfield, Mass., has told the committee of 100 of that city that the Bosch company will not move to another location, at least for the present, but that until it is definitely settled whether or not the meat rendering companies located near the Bosch plant, and against which many complaints have been made, are to move the Bosch company will not make any plans to extend its factory buildings. The company is building a restaurant for its employes now, and if the rendering companies were ousted it is probable that the magneto company would build additional extensions to its big plant.

Solving Building Problem—The Willys-Overland Co., which is engaged in doubling the capacity of its plant in Toledo, has employed a unique method of construction in the erection of the new transformer station in the center of the big factory buildings, which has created considerable interest among contractors. After signing the contracts President J. N. Willys awoke to the fact that carrying the material for the new structures through the main gates would block the factory system and more or less cripple the production of Overland cars, as well as interfere with the testers and hold up the installation of new machinery, parts and materials. Then it was decided to have all cement, glass, dynamos and other materials carried over the tops of the three-story factory buildings. Derricks were raised and spouts constructed for the work. All cement is being mixed

outside the main plant, hoisted above the outside factories and poured through the spouts to the site of the new building. Thus the work on the new building is progressing with all possible speed.

Overland's 1913 Order—Thirty-six thousand five hundred and eighty Overland cars were contracted for by dealers throughout the country before the 1913 announcement was made, says the Willys-Overland Co., which states that San Francisco has contracted for 3,000 cars, New England, New York city, Minneapolis, Kansas City and Philadelphia, 1,500 each, while Iowa will consume 2,500 Overlands. Every state in the union is taking from 25 to 100 per cent more Overlands than last year. Especially is the demand heavy in the middle and extreme western states. The farming sections will show the biggest increase.

Atlas Plant Closed Temporarily—The Atlas Motor Car Co. of Springfield, Mass., has practically closed its plant temporarily because of its inability to secure motors for its product. Plans are under way for a directors' meeting at which the capital stock will be increased from $250,000 to $350,000 and an arrangement made to build the motors at the plant. The question of a reorganization also will be discussed. The company has orders approximating $200,000 on its books and these would be largely increased if the company had not been handicapped just at this time in getting motors.

A New Chalmers Building—An accompanying photograph shows the site of the new Chalmers building in Detroit which will be a four-story reinforced structure. This building, which will take care of the inspection department and part of the final assembly, was commenced on August 1. It is expected that the building will be ready for occupancy by November 15. This addition is part of the plan for increasing the manufacturing facilities of the Chalmers plant. The present structure will have 55,000 feet of floor space. It will be 191 feet by 71 feet, connecting two of the main buildings and forming with them an H-shaped structure. The most improved style of power construction is being used. Plans call for all steel and concrete construction of the flush-ceiling type, that is, there will be no beams or girders shown anywhere in the interior, leaving the entire space available for machinery. There will be inserts for counter-shafts and the installation of any type of special design machinery. The plumbing and lighting facilities will be the most improved known to modern construction. An arched driveway will leave open the rectangular street entrance to the testing yard and the new structure will make possible a floor to floor tramway between two of the large manufacturing plants. The big increase in the Chalmers business in the last year has brought about a congestion in the factory, even though the present plant has a manufacturing floor space of 1,000,000 square feet. Two large tents were set up a few days ago to take care of the congestion in the final assembly department. Fully equipped, the cost of the building will be $150,000 to $200,000.

Chevrolet Buys a Plant—Official announcement is made that the Chevrolet Motor Co. has purchased the plant of the Imperial Wheel Works and will open a factory in Flint about September 1. The Chevrolet company is one of the organizations owned by the Republic Motor Co., recently capitalized in Delaware for $65,000,000.

Rim Company Elects Officers—The Detroit Demountable Rim Co. held its annual meeting last week and elected A. H. Goss treasurer and general manager, to succeed Harry M. Snyder, who retires to go with the Reo company at Lansing. Chester C. Harbridge, who has been vice-president since the organization of the company, was elected president.

Atwater Kent Moves—The Atwater Kent Mfg. Works has removed to its new factory building in Philadelphia. The new building is a one-story structure containing 21,000 square feet, especially designed for the work of this concern. It is situated on the line of the Philadelphia and Reading Railway, Germantown and Chestnut Hill division, at the corner of East Logan street and Stenton avenue, near Wayne Junction.

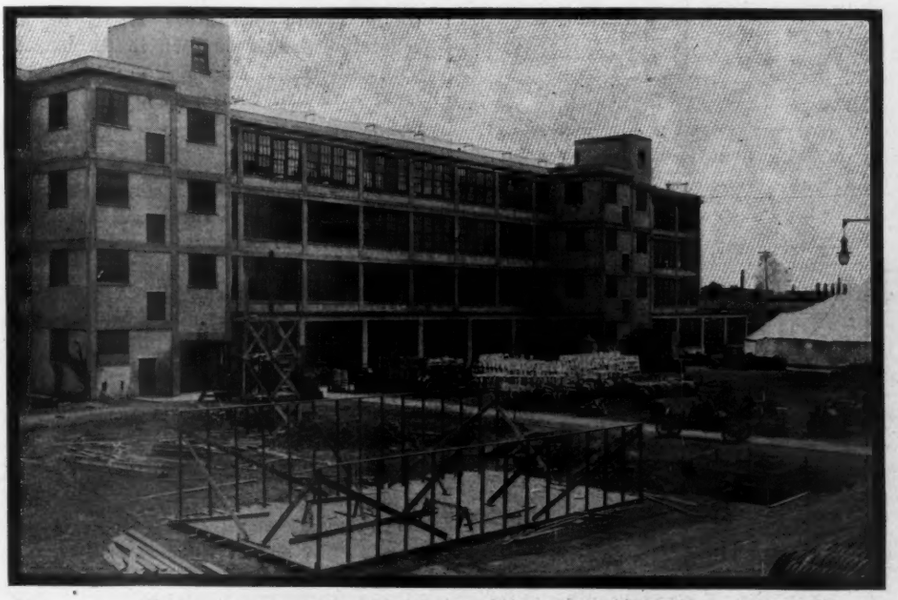
More Buildings for Goodrich—Building Inspector Goodwin of Akron, Ohio, has approved plans prepared by the B. F. Goodrich Co., for the erection of a large addition to the office building. It is the plan of the officials of the company to combine the office forces of the Goodrich and the Diamond companies and as a result a larger office building will be necessary. The estimated cost of the addition will be $100,000. When completed the structure will be 228 feet long and five stories high instead of four stories. The lower floors of the addition will be used for the general offices while the fifth floor will be reserved for the offices of the officials of the corporation. The work of construction will be started at once.

Will Retire Preferred Stock—The stockholders of the Goodyear Tire and Rubber Co., of Akron, Ohio, will meet September 9 for the purpose of voting on the proposition of changing the constitution and by-laws in order to retire the preferred stock after 1915.

Morgan Company Reorganized—The Morgan Motor Truck Co., of Worcester, Mass., has been reorganized with Charles B. Foster, president; Evan F. Jones, treasurer; Charles H. Derby, clerk; Jerome R. George, John E. Bradley, Charles B. Foster and Lancaster P. Clark, directors. The capital stock has been reduced from $1,100,000 to $300,000.

Building New Tire Plant—The plant of the Toronto Rubber Co., of Toronto, Ohio, will be completed about September 15, when it will be placed in operation. All of the repair work and improvements on the plant which was formerly occupied by the American China Co., will be completed by that time and the machinery installed. It is the intention to employ about seventy-five men at the start. The company will manufacture all kinds of rubber articles, including tires and other motor car accessories.

Franklin's Increased Business—Figures just completed by the Franklin Automobile Co. show that the average increase in Franklin business all over the country is 20 per cent over the mean proportional between the business of 1910 and 1911. These figures are particularly interesting when it is known that they cover only the first 6 months of this year, whereas the figures used as a basis for comparison covered the entire selling years of 1910 and 1911. The increase is all the more marked because it is made in the sales period which is usually termed dull.



START OF ADDITION TO CHALMERS FACTORY AT DETROIT

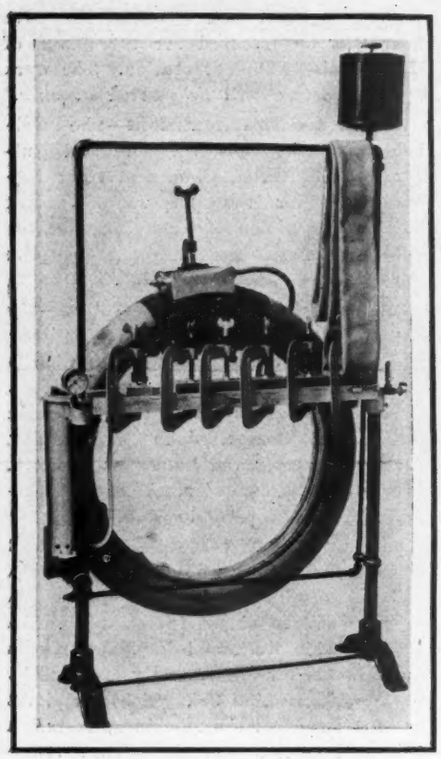


FIG. 1—SHALER GARAGE PLANT

Development Briefs

New Garage Vulcanizing Plant Uses Thermostat—Red Head Platinum Point Plugs—Extra Large Spark Plug for Trucks—Mazda Motor Lamps—Mello-Tone Exhaust Signal

New Garage Vulcanizer

SIMILAR to the familiar Shaler portable vulcanizers, a new garage plant has been brought out by the C. A. Shaler Co., of Waupun, Wis. This vulcanizer shown in Fig. 1, like all of this make is of the steam type. The boiler which appears at the left of the picture, is virtually of the water tube type, and is fitted with a steam gauge and safety valve. In addition to these features, however, it is equipped with the new thermostatic controller, described in these columns on Aug. 1st. This device, which consists of two springs of dissimilar expansive qualities, connected at their point of greatest flexure to a damper, is of especial value in a garage plant, as it permits the busy garage man to divert his valuable attention without fear of either undercureing or burning the job. A gasoline burner is used, which it is said will burn all day at a cost of but 1 cent per hour. Twenty minutes, it is asserted, is all that is required to generate full steam with this combination. It has a capacity of one casing and six tubes at a time.

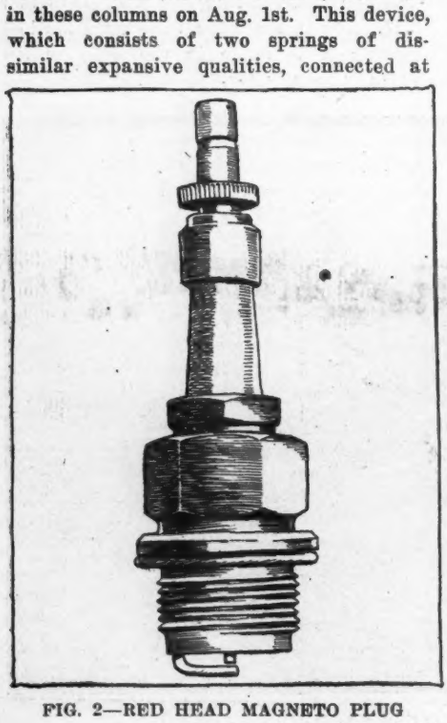


FIG. 2—RED HEAD MAGNETO PLUG

New Interchangeable Bearings

Interchangeable with annular ball bearings of the same size, but adapted to greater loads, the annular roller bearing shown in Fig. 4, has been brought out by the Standard Roller Bearing Co., of Philadelphia, Pa., in response to a demand for a bearing which might be substituted for a regular ball bearing, where the latter was found to be unadapted to severe loads.

This bearing is interchangeable in every way with annular ball bearings, using the same system of numbering. It is claimed to be capable of sustaining twice the load of the ball type of equal size, or to last twice as long under the same conditions of service. Spacers or retainers are used, and annular projections on the races engaging grooves in the rollers, prevent side movement. The rollers are true cylinders instead of the usual tapered type, and run in a true axial plane with the mounting. It is especially designed by the manufacturers for use on crankshafts, where severe loads are constant. These bearings are not thrust bearings, and where severe end-thrust is to be encountered, should be used in conjunction with ball thrust bearings, in the manner usual with ball bearings.

Rajah Giant Plug

Embodying the general structural features that characterize former Rajah plugs, the latest product of the Rajah Auto Supply Co., of Bloomfield, N. J., shown in Fig. 3, differs from other models in the size of its porcelains. These porcelains have been made unusually large to adapt them to use on motor tractors and trucks, and in motor car and motor boat racing, where the conditions of use are more severe than most plugs are designed to stand. The porcelains are made in Europe, where it is claimed that better manufacturing facilities are available than in this country. The metal parts are machined to S. A. E. standards of both size and accuracy, and are made extra heavy to correspond with the insulators. The electrodes also are made heavy and of a special alloy of imported metal to withstand the strongest magneto spark.

The characteristic features that have been embodied in this line for 8 years are retained. Among these are extreme simplicity and ease of disassembly for cleaning and repair. The plug consists of but four parts, viz., the porcelain, the shell, the brass bushing and the inside copper-asbestos gasket. In the design of the shell special attention has been given to the prevention of short circuits due to excessive oil, and complete protection of the porcelains. The knife-edge bushing renders but one gasket necessary; and the button-top feature, in connection with the Rajah terminal, which is furnished with every plug, dispenses with the usual thumb-screw binding post. All parts with the exception of porcelains and electrodes, which are imported, are made in one factory.

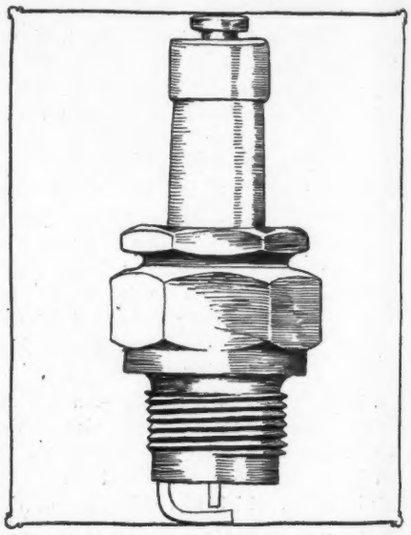


FIG. 3—RAJAH GIANT HEAVY-DUTY PLUG

Mello-tone Exhaust Horn

Featuring an adjustable clamp, which enables it to be attached to any size of exhaust pipe, and an adjustable tone, which permits a wide range of tone variance, applied to an exhaust of any pressure, the Mello-tone exhaust signal is manufactured by the Electric City Mfg. Co., of Buffalo, N. Y. It operates by means of a foot-pedal operated cutout valve, which when closed over the end of the exhaust pipe to which the horn is attached, deflects the gases through a cylindrical tube, closed at one end, producing a mellow tone that is clear and distinct, but not unmelodious. The cutout mechanism is noteworthy in that it oper-

Novelties for Motoring

Roller Bearings Interchangeable with Ball Type—Small Electric Pump for Garages—Self-Cleaning Exhaust Chime—Late Devices of Interest to the Motorist and Repairman

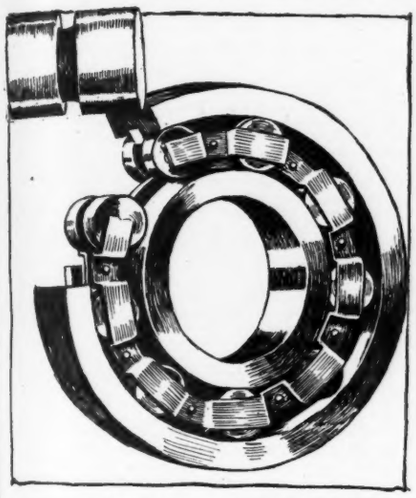


FIG. 4—STANDARD INTERCHANGEABLE BEARING

ates on a somewhat different principle from that used by most signals of this character; the whole signal being pivoted at one side to the clamp, being held away from the opening by a spring when not in use, and being drawn across it by the pedal connections, to deflect the gases into the sounding bell. This is said to obviate both back pressure and the purring sound so often associated with such signals of this kind when not in use. The horn is shown in Fig. 5.

Motor Car Mazda Lamps

Electric light is coming into such popularity, that the General Electric Co., Harrison, N. J., has brought out a special lamp for use in electric head-lights. This lamp is of the mazda type, but specially adapted to the stringent vibratory conditions of motor car service. This improvement is, as is to be expected, the idea of Edison, and consists of a drawn wire filament, which retains its lighting efficiency of 2½ times as great as the carbon, but owing to its manufacture possesses about twice the strength of the ordinary tungsten. It is made in sizes of from 9 to 24 candlepower.

Prevent Spring Rattling

Manager H. G. Trench of the repair department of the Norcross-Cameron Co. garage at Springfield, Mass, has just received patent papers on a spring shackle device designed to prevent the rattling of springs after they begin to wear.

When a car is used for some time the plates begin to wear against the sides of the spring and as there is no way to compensate for this the plates rattle. Mr. Trench's device does away with this because one of the plates has recessed in its springs pressing against the nut which acts as a nut lock and takes up the wear. The result is that the plates are held as firmly as when first put on new and rattling is eliminated. It can be used on semi-eliptic and three-quarter eliptic springs.

Electric Garage Tire Pump

Peculiarly suited to the requirements of a small private garage is the electric tire pump illustrated in Fig. 6. This pump is extremely simple, and uses the ordinary lighting current. It is mounted on two small wheels and consists of a single-cylinder, air-cooled vertical compressor, with a closed base, geared direct to the motor. The compressor has but one valve and is lubricated by means of a grease cup in the side of the cylinder and on the crankshaft bearings. The truck is fitted with a rigid tongue which has convenient hooks to support the tube. The outfit includes a switch, 20 feet of lamp cord, with plug, and 6 feet of ½-inch hose, provided with a tire valve connection and pressure gauge. It is built by the Ingersoll-Rand Co., of New York.

Red Head Platinum Point

Super high-tension magnetoes, as employed in the ignition of many of the high-grade high-powered cars for 1913, has made new demands on the manufacturer of spark plugs. So hot is the spark generated in many of these systems that any metal but the best platinum is soon fused by the terrific discharge on the delicate sparking point.

The Emil Grossman Co., of New York, in response to the new demand, has brought out the latest of its family of Red Head spark plugs, the Red Head platinum point plug, shown in Fig. 2. It differs in general design and appearance very slightly from the previous models, the chief difference being in the composition of the sparking points, which are of a high-grade platinum, 1/32 inch thick. A new binding post design also has been incorporated in this plug, which is a combination of the screw top and snap-on types of terminals. It will accommodate snap, ring, or slip cable connectors of all types.

To give individuality to the new product, and avoid confusion with its fellows, the magneto plug has been plated with a heavy double-dipped nickel shell, cap and bushing, to harmonize with the popular nickel trim of high-powered motors. A unique and practical container of bullet shape has been provided for this plug, into which it screws, to protect the points.

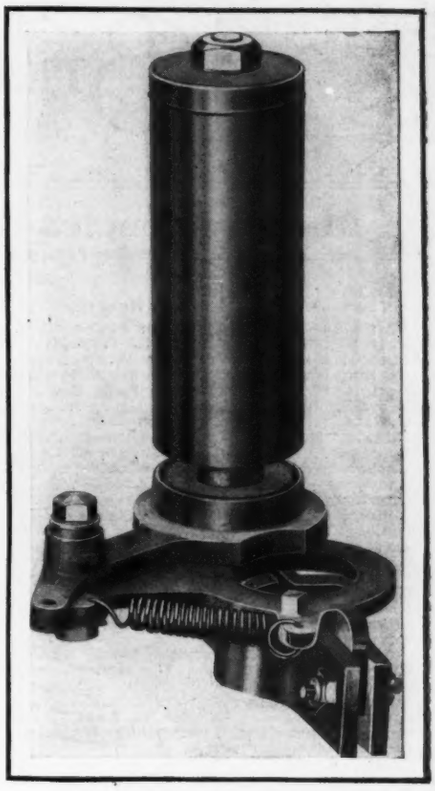


FIG. 5—MELLO-TONE SIGNAL

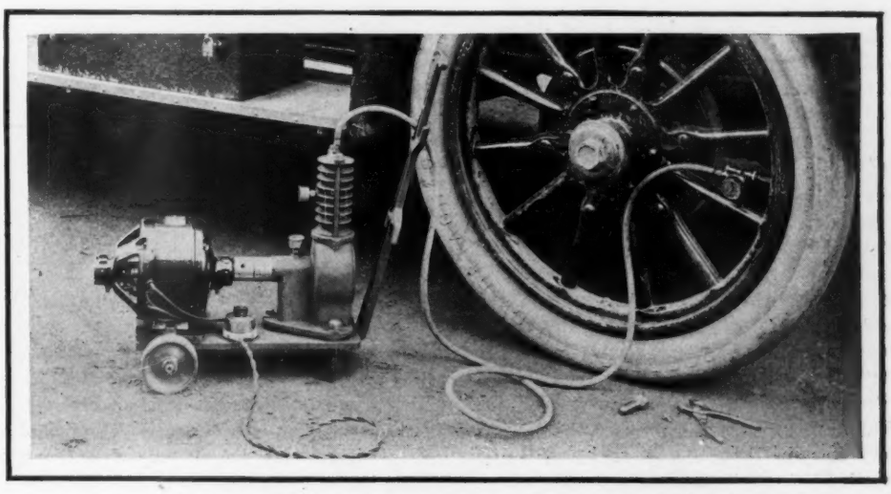


FIG. 6—INGERSOLL-RAND CO.'S ELECTRIC TIRE PUMP

Brief Business Announcements

Recent Agencies Appointed by Car and Truck Manufacturers

PLEASURE CARS

Town—	Agent	Make
Battle Cr'k, Mich.	American Motor Co.	Franklin
Boston, Mass.	Dayton G. True	Krit
Boston, Mass.	Frederick A. Dutton	Abbott-Detroit
Boston, Mass.	Glossbrenner Commercial Car Co.	Stutz
Boston, Mass.	Dunham Auto Co.	Standard
Boswell, Ind.	Levi J. Orr	R. C. H.
Buffalo, N. Y.	E. E. Grimmel	Ideal
Buffalo, N. Y.	Louis G. Schoepflin Co.	Hupp-Yeats
Chicago	J. G. Tennant & Co.	Henderson
Casper, Wyo.	Casper Machine and Garage Co.	Cole
Cheyenne, Wyo.	Boyle and Joffee	Cole
Charleston, S. C.	King Auto and Repair Co.	Cole
Canton, Ill.	Meade McClathey	Henderson
Dallas, Tex.	R. H. Davis and L. P. Turney	R. C. H.
Davenport, Ia.	Knueppel and Ott	R. C. H.
Decatur, Ill.	F. D. Parker	Henderson
Elizabethtown, N.Y.	V. W. Prime	R. C. H.
Elizabeth, N. J.	Franklin Auto Co.	R. C. H.
Enderlin, N. D.	B. N. Engle	R. C. H.
Edison, Ga.	C. C. Weaver	Oakland
Edmonton, Alberta, Canada	Standard Motor Car Co., Ltd	Henderson
Galveston, Tex.	John Christenson & Co.	Cole
Granville, N. Y.	G. C. Walker	R. C. H.
Harvard, Ill.	W. F. Wittmus	R. C. H.
Haverhill, Mass.	Samuel E. Cass	R. C. H.
Independence, Kans.	J. A. Pinkston	R. C. H.
Indianapolis, Ind.	Finch and Freeman	Nyberg
Leads, S. D.	Blodgett Brothers	Cole
Lander, Wyo.	Cole and Co.	Cole
Lowell, Mass.	City Hall Garage	R. C. H.
Madison, Wis.	Schoellkopf Co.	Ford
Milwaukee, Wis.	W. E. Allen Co.	McFarlan
Milwaukee, Wis.	W. E. Allen Co.	Marion
Madison, Wis.	Spooner-McConnell Auto Co.	Oakland
Madison, Wis.	Spooner-McConnell Auto Co.	Kisselkar
Milwaukee, Wis.	Wagner & Johnson	Regal
Madison, Wis.	W. H. Hobbs Supply Co.	Chalmers
Madison, Wis.	Spooner-McConnell Auto Co.	R. C. H.
Norton, Mass.	A. W. Sibley	R. C. H.
New Brunswick, N. J.	New Brunswick Garage Co.	R. C. H.
Oconto Falls, Wis.	Munsert-Carlson Auto Co.	Ford
Plattsburg, N. Y.	R. W. Squires	R. C. H.
Portland, Ore.	H. L. Keats	Rauch & Lang
Paterson, N. J.	F. P. Venable	R. C. H.
Rochester, N. Y.	E. W. Fisher	Mitchell
Rochester, N. Y.	John Grape	Dart
Ridgeville, Ind.	J. Carpenter	R. C. H.
Red Lodge, Mont.	J. P. Punkett	R. C. H.
Rutland, Vt.	Rutland Garage Co.	Cole
Springfield, Mass.	F. W. Davis & Sons	Henderson
South Ben, Ind.	Johnson Beattie Auto Co.	R. C. H.
Sullivan, Ind.	E. S. Crowder	R. C. H.
Somerville, N. J.	Thomas Motor Car Co.	R. C. H.
Springfield, Ill.	R. Haas Electric and Mfg. Co.	R. C. H.
Sheboygan, Wis.	Sheboygan Automobile and Supply Co.	Studebaker
St. Louis, Mo.	George C. Brinkman	Nyberg
Thomasville, Ga.	Thomasville Motor Co.	Oakland
Twin Falls, Id.	Swim & Aldrich	Franklin
Worcester, Mass.	Caton-Brewster Co.	Pope-Hartford
Zion City, Ill.	Duncan G. Bellows	R. C. H.

TRUCKS

Boston, Mass.	R. H. and R. L. Smith Co.	Brown
Cleveland, O.	Eckenroth Sales Co.	Federal
Dallas, Tex.	Fife and Miller	Lincoln
Indianapolis, Ind.	Finch and Freeman	Nyberg
Melbourne, Australia	American Truck and Auto Co.	Federal
New York	Rockwell Motor Transportation Co.	Lincoln
Sioux City, Ia.	Interstate Auto and Supply Co.	Federal
St. Louis, Mo.	George C. Brinkman	Nyberg
Tecumseh, Mich.	L. C. Hayden	Federal
Washington, D. C.	Motor Truck Co.	Atterbury
Washington, D. C.	Motor Truck Co.	Hatfield

LA CROSSE, Wis.—The Zimmer garage was damaged $10,000 by fire on August 16.

Boston, Mass.—Lester E. Grant, formerly a member of the Hollander Motor Car Co., agent for the Metz in Boston, has resigned to go with the Williams Brothers Co., agent for the Cartercar.

Baltimore, Md.—Callahan Brothers & Co., representatives for the Morgan truck and De Tamble car, have moved from their old quarters at 328 North Charles street to their new garage and salesrooms at 1112 Morton street.

Boston, Mass.—The Selbach Rubber Co., a Massachusetts corporation doing business at 404 Columbus avenue, has assigned. The assignment was made to Walter Powers, but no estimate has been made of the value of the business or the amount of the indebtedness.

Toledo, O.—C. R. Bowersox, manager of the Bowersox Motor Sales Co., has closed a contract with the Regal Motor Car Co., of Detroit, which gives this concern the exclusive sale of Regal cars in northwestern Ohio. The retail sales in Toledo will be handled direct from the local salesrooms, while the northwestern territory except Bryan, O., where the Bowersox company has a branch, will be handled through sub-agents. The company has been selling agent for the Everitt cars in most of the smaller cities and towns and most of the dealers will now handle both lines.

Richmond, Va.—The Chesterfield Automobile Co. has moved into a new garage on West Broad street.

St. Paul, Minn.—The Studebaker Corporation is making over an old church at Franklin and Sixth streets for its St. Paul agency. The changes will be completed in 60 days.

Columbus, O.—The Auto Exchange, 539 North Park street is the name of a new concern opened by R. C. Shisler, formerly connected with the Ohio Auto Sales Co., of Columbus. The concern deals in second-hand cars only.

Portland, Ore.—J. E. C. Maxon, formerly president and general manager of the Portland-Detroit Auto Co., has disposed of his interest in the firm and in future will be connected with the selling end of the Nob Hill and Garage Co., Portland agents for the American.

Indianapolis, Md.—On a petition filed by the O'Bannon Corporation of New York, George L. Paetz, also a creditor, has been appointed receiver for the Indianapolis Auto Top and Rubber Tire Co. by the superior court in Indianapolis. The petition was based on an account amounting to $183.83. It is charged the concern is in imminent danger of involvency and has debts aggregating $5,000. The company manufactures motor car tops and does general tire repairing.

Richmond, Va.—Plans are being prepared for a garage for the Ford Automobile Co., West Broad street, to cost $25,000.

Boston, Mass.—M. R. Paige, formerly sales manager of the Moline Wagon Co., Moline, Ill., has gone to Boston to join the Boston branch of the Velie, taking charge of the commercial department.

Toledo, O.—The Dennis Motor Co., recently organized in this city, has opened an establishment corner of Madison avenue and Fifteenth street. The company handles the Rambler, Alco, Cino, Lozier and Detroit electric cars.

Buffalo, N. Y.—At a reorganization of the Positive Clutch and Pulley Co., manufacturer of patented power transmission appliances, Ulysses L. Caudell was elected president; Thomas A. Chrisholm, vice-president, and Geoffrey T. Clarkson, secretary-treasurer.

Toledo, O.—The Jamieson Brothers Motor Co., now owner of the three-story building and ground at 137-9 Huron street, purchased for $31,500, will erect new buildings on the site, which will be used as an annex to its present large garage and sales rooms. The new building will be of pressed brick and will cost about $20,000. Work on the new structure to be used as part

of the First Garage and Motor Co., will be started directly on the expiration of the lease held by the Toledo Chandelier Co.

Portland, Ore.—The Alco Motor Car Co. has taken the second story of the Paquet garage in Portland on East Eighth street.

Toledo, O.—William H. Moore has accepted a position as sales manager with the new Gramm-Bernstein Co., of Lima, O. Mr. Moore formerly was connected with the Gramm Motor Truck Co.

Madison, Wis.—The Ritter Automobile Co. has broken ground for a new garage building of reinforced concrete construction, two stories and basement high, 66 by 76 feet in size, at Johnson, Henry and State street triangle.

Wilmington, Del.—The Gomery-Schwartz Co., local agent for the Hudson, has taken the large garage and sales rooms at 1011 Orange street, erected about a year ago by the Stoddard-Dayton company, the latter having taken a new garage at Eleventh and West streets.

St. Paul, Minn.—The Northwest Kissel Kar Co. will open its St. Paul service garage September 15, 237 West Ninth street, St. Paul, with 30,000 square feet of floor space. It will be three stories with an 8-ton elevator. The cost will be $60,000.

Detroit, Mich.—The Ignition Starter Co. has opened a branch in Indianapolis with H. L. Morgan in charge as manager. The company has closed a deal for a plant in this city which will give it a floor space of 100,000 square feet for the manufacture of its new electric starting device.

Boston, Mass.—Frank H. Coyne, doing business in Boston and New York under the name of the Detroit Tool Sales Co. and the Portable Machine Shop Co., an accessory concern, made an assignment last week. He owes $95,405, of which $95,201 is unsecured among about 200 creditors. The creditors are scattered throughout the country.

Baltimore, Md.—A receiver has been appointed for the Madison Motor Car Co. of this city by Judge Dawkins in the circuit court. The bill of complain was filed by Pinckney L. Sothoron who states that he is a stockholder of the company, having twenty-five shares at $100 a share. The company consented to having J. Milton Lyell appointed receiver and permission was granted to the receiver to continue the business for 60 days.

Madison, Wis.—The Power-Stevens Fan Devices Co. has been organized at Madison, Wis., with a capital stock of $150,000 to manufacture devices invented by J. J. Power of Madison. The principal invention is a fan or blower adapted especially for motor car cooling use, although it has been adapted for vacuum cleaners, ventilating devices, sanitary systems and other purposes. The company has elected these officers. President, Joseph C. Schubert; vice-president, J. J. Power; secretary, John E. McWilliams; treasurer, Leroy W. Stevens, Chicago. Plans for manufacturing are now being completed.

Utica, N. Y.—The Iroquois Auto Top Co. has removed its factory from the Whiffen block to the Cox building, Columbia street.

Seattle, Wash.—The Detroiter car has arrived in Seattle and the agency has been taken by the Olympic Motor Car Co., while the Union Motor Car Co. will act as distributor for the new car in Tacoma.

Moline, Ill.—C. E. Giltner, formerly with the Rambler, of Omaha, has accepted a position with the Velie Motor Vehicle Co. Mr. Giltner formerly was manager of the Racine-Sattley Mfg. Co. and also at one time with the Moline Plow Co.

Oconto Falls, Wis.—The Munsert-Carlson Auto Co. has been organized at Oconto Falls, by W. J. Munsert and C. W. Carlson and incorporated for $5,000 to conduct a garage and deal in motor cars. The concern will handle the Ford in this territory.

Baltimore, Md.—The Locomobile Co. of America is now in its new location at 109 to 121 West Mount Royal avenue, formerly the headquarters of the Stoddard-Dayton Auto Co. T. W. Wilson is manager of the local branch of the Locomobile company.

Buffalo, N. Y.—Frederick R. Thompson and George A. Brockway, both of Homer, N. Y., have leased the plant of the Ellis Omnibus and Cab Co., Cortland, N. Y., for their factory, in which to manufacture motor trucks. The plant was leased with an option for purchase if later desired.

Boston, Mass.—Joseph D. Warren, formerly with the Metzger Motor Car Co., has become New England manager of the Abbott-Detroit, and he is negotiating now with some Bostonians to take over the Boston agency that has been at a standstill since the death of Willard M. Jenkins, a few months ago.

Seattle, Wash.—After having been without representation in Seattle for the past year, the Franklin has again appeared in the Queen City under the management of W. A. Wicks, who has opened salesrooms at 1109-11 East Union street. Mr. Wicks is from the engineering department of the H. H. Franklin Co. and has taken the distributing agency for the states of Washington and Oregon and the province of British Columbia.

Baltimore, Md.—The White company is now represented in Baltimore by a direct branch. This change took place August 1, and was the outcome of the White Automobile Co., Mount Royal and Guilford avenues, formerly the agent for the White company, being merged into the White Motor Car Co. Charles E. Tracy has been brought direct from the White factory to take charge of the branch. Jay S. Strouse will continue as head of the sales department of the company and Frank L. Hupka will be superintendent of the mechanical branch.

Hartford, Wis.—The garage firm of Walters & Wittig, of Hartford, Wis., has been dissolved, Charles F. Wittig continuing the business.

Columbus, O.—Richard Westwater will act as distributor for the Inter-State in central Ohio. B. R. Currier, formerly connected with the factory at Muncie will act as city sales manager for the Inter-State.

Buffalo, N. Y.—Arthur J. Stuart, formerly connected with the Kisselkar company, has been appointed sales manager of the Mason B. Hatch Co., Main and Northampton streets, which concern handles Chalmers and Stearns cars.

Boston, Mass.—Roberts & Sherburne, who have taken on the American for Boston, have placed G. W. Hamilton in charge as manager of the agency. George Brown, who went to Boston from the American factory at Indianapolis, is manager of the service department.

Buffalo, N. Y.—The Studebaker Sales Co. has been incorporated with capital of $25,000, directors being Arthur W. Haile, Bradley N. Phillips, and E. C. Schlenker, all of Buffalo, N. Y. The new concern will deal in motor cars and accessories. Commercial vehicles may be added later.

Cincinnati, O.—The Victor Auto Parts Co. is a new concern that will enter into business here. Articles of incorporation have been filed capitalizing the new company at $20,000. William J. Corcoran, Edward W. Corcoran, Harvey B. Corcoran and H. R. Kearns are the founders of the new concern.

Columbus, O.—The Capitol Garage and Storage Co., which is a partnership composed of H. A. Sell and J. R. Glancy, has opened a large garage and repair shop at the southwest corner of Third and Rich streets. The building contains 10,000 square feet of storage space. The company has taken the agency for the Rambler in Franklin county.

Columbus, O.—The Franklin Automobile Garage is the name of a new concern of which B. H. Lawwell is manager, which has taken over the garage at 846 West Broad street formerly conducted by Morgan and Kaiser. The garage is fully equipped with a repair shop and vulcanizer and is housed in a new structure 50 by 75 feet. For the time being at least no line of cars is handled.

Portland, Ore.—Three Portland men have organized the Buick Motor Car Co., to handle Buick and National cars for western Washington, with headquarters in Seattle. The company is backed by A. S. Eldridge, a contractor; Mel G. Johnson, manager of the Howard Automobile Co., of Portland, and James Fenton; Fenton will be actively in charge of the sales end of the new concern. Johnson will retain his present position and will act only in

an advisory capacity in the Washington company.

Buffalo, N. Y.—The Remy Electric Co., of Anderson, Ind., has opened a service station at the Frey Auto Supply Co., 700 Main street, Buffalo, N. Y.

Wilwaukee, Wis.—The Milwaukee Rubber Works, 472-476 Twenty-seventh street, Milwaukee, has taken larger quarters at 1928-1930 Vliet street. The company manufactures inner-liners and other tire and rubber specialties.

Racine, Wis.—A new type of self-starter for motor cars is to be marketed by the Faultless Starter Co., of Racine, Wis., incorporated for $10,000 under the laws of Wisconsin. The promoters are Dr. C. I. Shoop, Samuel Hansen, Mortimer Walker and J. Barker.

Norwalk, O.—The Big garage, located on South Hester street, has been sold by Hawk & Lydy, who have operated it for the past year, to John V. Metz who will continue to operate the garage and repair shop and will handle a line of supplies and accessories. The company has the agency for the Paige-Detroit.

Spokane, Wash.—W. J. Healy, who for the last 4½ years has been in the motor car business in Spokane and for the last 2½ years as manager of the Pacific Motor Car Co., has withdrawn from the Pacific company and will go into business independently. In leaving the Pacific company, Mr. Healy takes with him the Peerless agency and will handle it and the Rauch & Lang electric. His garage and salesrooms are located at 1023 Third avenue.

Columbus, O.—The three-story building at 241 North Fourth street, which is occupied by the Hudson Sales Co., is being thoroughly renovated and remodeled.

Worcester, Mass.—The Pope-Hartford has made a change in its agency at Worcester, giving it to C. D. Brewster, of Marlboro, and Eugene L. Caton, of Worcester. The Caton-Brewster Co. will locate at 758 Main street.

St. Paul, Minn.—The Foster-Lawrence Co. and the Morgan-Bond Co., St. Paul, have rented jointly the garage at 197 West Fifth street. The Foster-Lawrence company handles the Stearns-Knight and Detroit electric and the Morgan-Bond company the Stegeman truck.

Columbus, O.—The Broad-Oak Automobile Co., 521 Oak street, which was recently taken over by a new set of owners, has retained Ira P. Madden in the capacity of sales manager. Ralph P. Atkinson has been placed in the position of superintendent. The other officers were announced some time ago.

Columbus, O.—W. H. Batsdorf and John Borst have opened a garage and repair shop in a new two-story building at 381 South Fourth street, which will be called the Paterson Auto Garage Co. The building is 65 feet square and is equipped with a complete repair shop. W. H. Batsdorf has the state agency for the Paterson and the local company will be the distributer in Franklin county.

Buffalo, N. Y.—Charles E. Flory has secured agency in Buffalo, for the Hudson. A service station will be operated in connection with the local Hudson branch.

Boston, Mass.—V. C. Kraemer, who went to Boston and opened a branch for the Flanders electric, has resigned and returned to Detroit, where he has entered another line. The branch will be changed to an agency later.

Buffalo, N. Y.—W. B. Brayton of Cleveland, O. has been elected president of the Regal Motor Sales Co., the new local branch of the Regal Motor Car Co., of Detroit, Mich., which was formally opened August 19 at 1462-1466 Main street.

Baltimore, Md.—The Marathon Motor Sales Co. is the latest entry into the Baltimore and state of Maryland field. This company is handling the Marathon line of motor cars. The company is temporarily located at 1902 Kennedy avenue, while the service station will be located at garage 10 on Morton street.

Toledo, O.—The Banting Machine and Supply Co. has acquired the M. O. Baker building, 120-4 Superior street, and will install a large motor car display and salesroom. The Baker building, which adjoins the building now occupied by the Banting company, will be remodeled. The first floor car display room will be made entirely public by the installation of an all-glass front.

Recent Incorporations

Akron, O.—Ideal Commercial Car Co.; capital stock, $200,000; to manufacture motor cars, engines, trucks, etc.; incorporators, H. C. Gates, A. Tschantz, A. J. Dettoff, M. Stump, E. E. Quirk.

Akron, O.—Dutch Rubber Co.; capital stock, $1,250,000; to manufacture rubber goods and motor car tires; incorporators, E. L. Schnee, C. R. Grant, I. A. Grant, F. E. Sherman.

Akron, O.—Marathon Tire and Rubber Co.; capital stock, $10,000; to deal in motor car tires and rubber goods; incorporators, E. R. Diehm, C. C. Owens, S. Newell, D. McBride, H. J. Crawford.

Boston, Mass.—Cambridge Station Garage; capital stock, $6,000; incorporators, J. J. Guiney, F. W. Roberts, D. J. Murphy.

Boston, Mass.—Republican Motor Co.; capital stock, $1,000; incorporators, N. J. MacGaffin, E. M. Churchill.

Boston, Mass.—Motor Monitor Co.; capital stock, $20,000; incorporators, H. P. Soule, G. W. Chase, R. S. True, Jr.

Boston, Mass.—Co-operative Auto Sales Co.; capital stock, $10,000; directors, W. B. Angell, C. E. Walden, A. E. Meyers.

Brooklyn, N. Y.—Revilo Auto Co.; capital stock, $5,000; incorporators, Philip Roth, Donato Cella, Frank Dunn.

Brooklyn, N. Y.—Generator Valve Co.; capital stock, $2,000; to manufacture motor car parts; incorporators, Harry James, John James, S. Henry Holland.

Brooklyn, N. Y.—Greenpoint Tire Repair Co.; capital stock, $10,000; incorporators, C. E. Keller, A. Kovacs, J. Kovacs, Jr.

Cambridge, Mass.—D. Henry Bonner Co.; capital stock, $20,000; motor car business; incorporators, E. S. Howland, D. Henry Bonner, W. E. Furniss.

Cleveland, O.—South End Garage Co.; capital stock, $5,000; to operate garage and general repair shop; incorporators, A. Haskin, H. Lewis Mock, H. Sadugar, J. E. McNemar, J. Goldstein.

Cleveland, O.—Mutual Oil and Auto Supply Co.; capital stock, $10,000; to deal in greases, oils and motor car supplies; incorporators, M. L. Steuer, H. C. Kellerman, H. Haase, C. F. Franke, A. S. Kraus.

Columbus, O.—Southern Taxicab Co.; capital stock, $10,000; conduct taxicab service; incorporators, James J. Keating, James A. Allen, Thomas Becker, Jack S. Williams, A. D. Carmichael.

Columbus, O.—Southern Taxi-Cab Co.; capital stock, $10,000; to operate taxicab service; incorporators, J. J. Keating, J. A. Allen, T. Decker, J. Williams, A. P. Carmichael.

Columbus, O.—Engle & Vincent Automobile Co.; capital stock, $15,000; to deal in motor cars and accessories; incorporators, C. H. Engle, G. A. Marquardt, F. L. Vincent, C. W. Engle, J. K. Henry.

Dallas, Tex.—Marrs-Lingo Motor Co.; capital stock, $7,500; incorporators, A. A. Marrs, D. C. Lingo, J. W. Fox.

Hamilton, O.—Ideal Steel Wheel Co.; capital stock, $500,000; to manufacture and deal in spring wheels; incorporators, J. E. Strietelmeier, A. F. Parker, D. E. Kirgan, W. C. Taylor, James B. O'Donnell.

Lexington, Ky.—Commercial Auto Co.; capital stock, $1,500; incorporators, J. N. Gibbons, W. B. Williams, E. N. Williams.

Louisville, Ky.—Auto-Print Co.; capital stock, $20,000; incorporators, W. T. Givan, G. S. Washer, A. H. Bowman.

Milwaukee, Wis.—George W. Browne; capital stock, $5,000; deal in motor cars; incorporators, G. W. Browne, T. C. McMillan, Mark F. Browne.

Mount Vernon, N. Y.—West Side Auto Exchange; capital stock, $1,500; incorporators, J. S. Haslett, E. Jones, C. E. Haslett.

Newark, N. J.—Heath Method Co.; capital stock, $24,000; to manufacture supplies; incorporators, H. H. Wilcox, F. C. Overbury, F. A. Heath.

New Castle, Pa.—Lawrence Automobile Co.; capital stock, $40,000; incorporators, L. C. John, G. Greer, Roy Jamison.

New York—Rubberine Tire Filling and Sales Co.; capital stock, $500,000; to manufacture fillings for motor cars; incorporators, J. D. Bridges, J. C. Clarke, G. H. Davis.

New York—Pope Motor Car Co.; capital stock, $100,000; incorporators, F. E. Waldbridge, C. M. Stratton, G. M. Stratton.

New York—A. H. Kasner Tire Co.; capital stock, $10,000; incorporators, A. H. Kasner, A. Massari.

New York—Huribert Motor Co.; capital stock, $150,000; incorporators, J. P. Carroll, W. B. Carsweel, F. D. Peale.

New York—Harmon Yount Co.; capital stock, $10,500; incorporators, Daniel J. Hanckel, F. B. Hunt, H. M. Kelly.

New York—Newmastic Co.; capital stock, $250,000; incorporators, O. A. Parker, R. Weld, O. H. Bartine.

New York—Blitzen Co.; capital stock, $1,000; incorporators, W. G. Decker, J. B. Mackie, F. B. Scofield.

New York—Damon-Munson Corp.; capital stock, $2,000; motor car business; incorporators, H. W. Munson, F. L. Damon, C. T. Hopkins, A. Eger.

New York—Tredvent Tire Co.; capital stock, $100,000; to manufacture motor car tires; incorporators, N. A. Sterling, D. A. Sterling, Samuel Bing, Morris Rachmil, Louis Cantor.

New York—Rubberine Tire Filling and Sales Co.; capital stock, $500,000; incorporators, James D. Bridges, J. Curtis Clarke, George H. Davis.

Pomeroy, O.—Pomeroy Automobile and Garage Co.; capital stock, $2,500; to deal in motor cars and operate garage; incorporators, A. R. Clifton, N. L. Davis, T. W. Dorst, W. M. Davis, P. L. Clifton.

Philadelphia, Pa.—Keystone Kommercial Kar Co.; capital stock, $5,000; incorporators, W. C. Wetherill, A. W. Morris, William W. McKim.

Philadelphia, Pa.—Peerless Motor Car Co.; capital stock, $30,000; incorporators, R. W. Cook, O. Chew, G. B. Siddall.

Springfield, Mass.—Federal Chain and Mfg. Co.; capital stock, $200,000; directors, Frank D. Fuller, E. S. Hitchcock, T. W. Irwin.

Tampa, Fla.—West Coast Auto Co.; capital stock, $25,000; incorporators, Victor A. James, Frank J. James.

Troy, N. Y.—Pioneer Motor Car Co.; capital stock, $10,000; incorporators, H. J. Richardson, N. R. Holmes, George N. Nay.

Youngstown, O.—Folberth Carbureter Co.; capital stock, $70,000; to manufacture carbureters and accessories; incorporators, E. A. Hegg, N. Emery, E. A. Tobey.